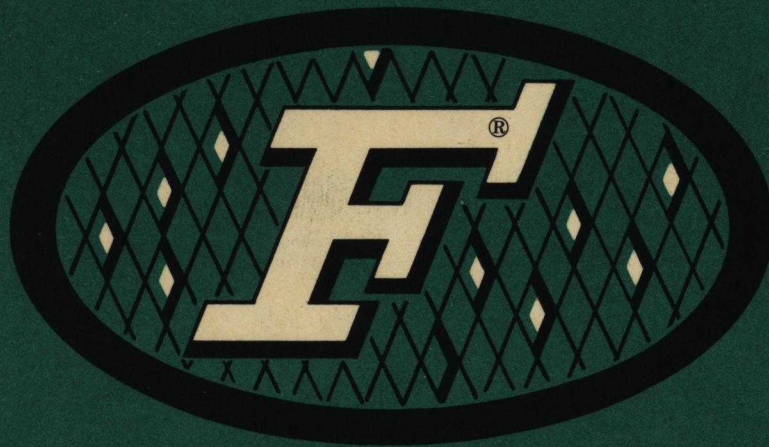


R.H. MUETH

catalog 164



CONSTRUCTION  
CASTINGS

- MANHOLE FRAMES & COVERS
- CASTINGS FOR DRAINAGE • CATCH
- BASIN GRATINGS • SEWAGE LINE CASTINGS
- WATER LINE CASTINGS • TRENCH GRATINGS
- WHEEL GUARDS

Castings covered in this catalog comprise the Flockhart line for the construction and allied industries. If your interest is exclusively marine send for Catalog No. 143 —“Dock Fittings & Castings.”

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# FLOCKHART CASTINGS

For the construction and allied industries, FLOCKHART FOUNDRY COMPANY manufactures a great variety of castings in the materials described below. Unless otherwise noted, these castings are made in the *finest quality* grey cast iron.

**CAST IRON:** Conforms to ASTM specification A-48 (latest revision), class 30 . . . develops a minimum ultimate strength of 30,000 psi. Because of its mechanical and physical properties and its low cost, cast iron—properly designed, is a highly desirable construction metal.

**DUCTILE (Nodular) IRON:** Conforms to ASTM specification A-339 (latest revision) in two grades . . . (1) alloy 60-45-10 which develops minimum tensile strength of 60,000 psi—minimum yield strength of 45,000 psi—minimum elongation of 10% and (2) alloy 80-60-03 which develops minimum tensile strength of 80,000 psi—minimum yield strength of 60,000 psi—minimum elongation of 3%. This newly developed metal combines the superior qualities of cast iron with the strength of cast steel. Because of relatively low cost, it is admirably suited for construction castings. Further information is available on request.

**ALUMINUM:** Conforms to ASTM specification B-26 (latest revision) . . . and TENZALOY specification ZC-81A.

**CAST STEEL:** Conforms to ASTM specification A-27 (latest revision) in two grades . . . (1) alloy 60-30 and (2) alloy 65-35.

**CAST BRONZE:** To specification.

## ENGINEERING SERVICE

With every Flockhart product goes a dividend of more than 80 years of sound, practical experience . . . experience in construction castings, armored concrete, wheel guards and related castings. All this know-how is available to architects, highway engineers, municipal officials—through the Flockhart engineering staff. For assistance in application of any products covered in this catalog or in the design of special products contact our Department of Research and Development.

## VARIATIONS FROM STANDARD

Many variations of Flockhart manhole frames, covers, gratings and other castings are available. Variations from standard are listed below, with identifying number.

- |                                |                                  |                                  |
|--------------------------------|----------------------------------|----------------------------------|
| 1 depth and flange dimensions  | 8 lock operated internally       | 14 square flange                 |
| 2 covers for concrete fill     | 9 cast aluminum cover or grating | 15 lettering on cover            |
| 3 horizontal, vertical milling | 10 steel plate cover             | 16 cast bronze                   |
| 4 horizontal milling           | 11 grating cover                 | 17 asbestos gasket               |
| 5 flush lift rings             | 12 aluminum plate                | 18 cast steel cover              |
| 6 drop lift handles            | 13 concentric covers             | 19 ductile iron cover or grating |
| 7 lock operated externally     |                                  |                                  |

## HOW TO ORDER

Flockhart castings are easy to order. Within each major "family" of castings—manhole frames, for example—each group is assigned a *type number* (such as type 600). Then within each group, each flange is given its own individual *code number* (such as 62000). Consequently, when ordering practically any Flockhart casting in this catalog, it is only necessary to give two numbers . . . (1) the *type number* of the group and (2) the *code number* of the desired combination of variables.

FLOCKHART  
GUARANTEE

Any casting designated ROADWAY that breaks in roadway service within a period of 10 years from date of invoice will be replaced gratis.



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#### OTHER FLOCKHART CASTINGS

FOR SEWERS, WATERWORKS: air vents for water mains, lift valves, pressure relief valves, slide valves, shear gate valves, wall sleeves, sludge shoes, stop plank grooves.

FOR BRIDGES: scuppers, railing posts, etc. . . . Write for complete drawing file.

FOR DOCKS: bollards, bitts, cleats, chocks—made in cast iron, ductile iron, cast steel, capstan frames, and covers, mooring eyes . . . Write for Dock Castings Catalog No. 143.

ALSO: adaptor rings, port bases, airport mooring eyes, chimney caps, heavy duty platform guards.



# MANHOLE FRAMES COVERS GRATINGS

standard

## ● circular ● for pit construction

for sanitary and storm manholes in municipalities, housing developments, schools, manufacturing plants, parking lots; built for heavy duty; economical

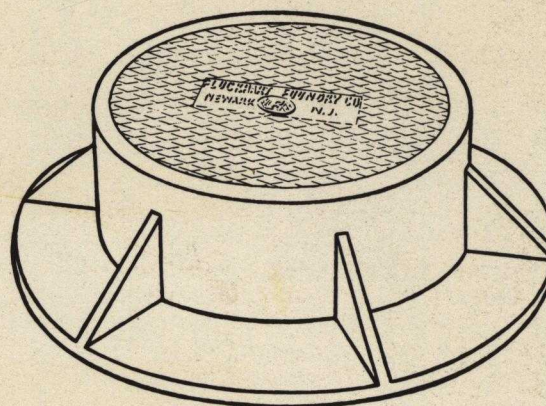
**variations:** 1, 2, 3, 4, 5, 6, 7, 8, 14, 15, 18, 19 (page 2)

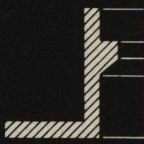
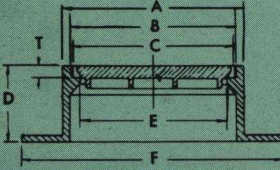
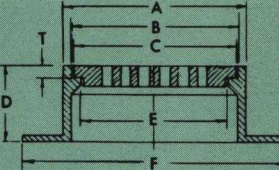
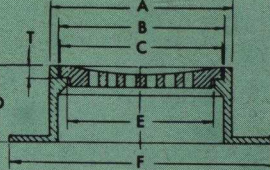
**guarantee:** ROADWAY types for 10 years

**ordering:** see page 2; also specify plane or concave grating

**for square frames and covers:** pages 10, 11

**for rectangular frames and covers:** pages 12, 13

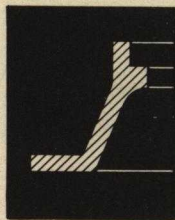


												
E	A	B	C	D	F	T	circular flange	square flange	circular flange	square flange	circular flange	square flange
<b>ROADWAY Type 684-D</b>							with cover		with plane grating		with concave grating	
10½	14	12¼	12	8	17	1¼	63300	63301	63302	63303	63304	63305
15	18½	16¾	16½	8	27	1¼	63306	63307	63308	63309	63310	63311
18	21¼	20½	20	8	29	1½	63312	63313	63314	63315	63316	63317
22	26	24¼	24	7	32	1¼	63318	63319	63320	63321	63322	63323
22	26	24¼	24	8	32	1¼	63324	63325	63326	63327	63328	63329
24	28	26	25¾	6	34	1½	63330	63331	63332	63333	63334	63335
24	28	26	25¾	8	34	1½	63336	63337	63338	63339	63340	63341
24	28	26	25¾	9¼	34	1½	63342	63343	63344	63345	63346	63347
27	31	29	28¾	7	37	1¾	63348	63349	63350	63351	63352	63353
30	34	32	31¼	6½	40	1½	63354	63355	63356	63357	63358	63359
30	34½	32½	32	8	40	1½	63360	63361	63362	63363	63364	63365
36	40½	38	37¾	7	46	1½	63366	63367	63368	63369	63370	63371
42	46	44	43¾	8	52	1½	63372	63373	63374	63375	63376	63377
48	52	50	49¾	8	58	1½	63378	63379	63380	63381	63382	63383
54	58	56	55¾	8	64	1½	63384	63385	63386	63387	63388	63389
60	64	62	61¾	8	70	1½	63390	63391	63392	63393	63394	63395
<b>WALKWAY Type 618-D</b>							with cover		with plane grating		with concave grating	
8	11½	10	9¾	8	16½	1	61104	61105	61102	61103	61100	61101
12	16	14½	14	6	23	1	61110	61111	61108	61109	61106	61107
18½	22½	20¾	20½	5	29	1	61116	61117	61114	61115	61112	61113
22	25¼	24¼	24	6	36	1¼	61122	61123	61120	61121	61118	61119
22	26	24¼	24	6	44	1¾	61124	61125				
24	28	26¼	26	6	34	1	61130	61131	61128	61129	61126	61127
28	31½	30¼	30	4½	39¾	¾	61136	61137	61134	61135	61132	61133
30	34	32¼	32	6	43	1¼	61142	61143	61140	61141	61138	61139
34	37	36	35¾	5¼	46	1½	61148	61149	61146	61147	61144	61145
36	39½	38	37¾	4¾	48	1½	61154	61155	61152	61153	61150	61151
42	45½	44	43¾	6	54	1¼	61160	61161	61158	61159	61156	61157
48	51½	50	49¾	6	58	1¼	61166	61167	61164	61165	61162	61163



# MANHOLE FRAMES COVERS standard

## ● circular • for pit construction

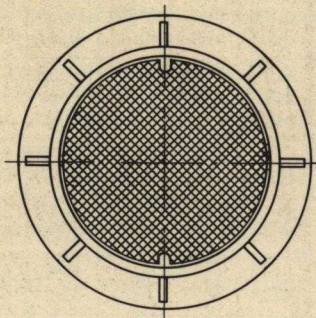
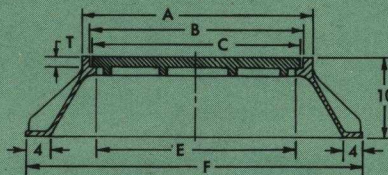


furnished with either square or round flange

variations: 1, 3, 4, 5, 6, 7, 8, 9, 11, 15, 16, 18, 19 (page 2)

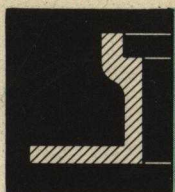
guarantee: ROADWAY types for 10 years

ordering: see page 2; also specify plane or concave grating



E	A	B	C	F	T	circular flange	square flange
<b>ROADWAY type 615-B with cover</b>							
24	28	26	25¼	43	1¾	60880	60881
27	31	29	28¾	46	1¾	60882	60883
30	34	32	31¾	49	1¾	60884	60885
36	40½	38½	38	55	1½	60892	60893
42	47	44	43¾	61	1½	60996	60997
<b>WALKWAY type 615-B with cover</b>							
24	28	26	25¼	43	¾	60886	60887
27	31	29	28¾	46	¾	60888	60889
30	34	32	31¾	49	¾	60890	60891
36	40½	38½	38	55	1½	60894	60895
42	47	44	43¾	61	1½	60998	60999

## ● circular • for pit construction

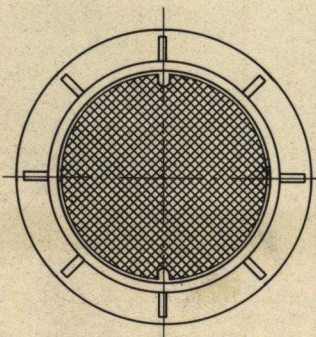
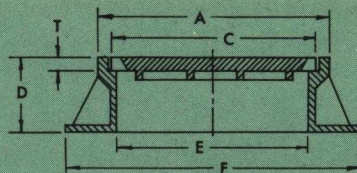


furnished with either square or round flange

variations: 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 18, 19 (page 2)

guarantee: 10 years

ordering: see page 2



E	A	C	D•	F	T	circular flange	square flange
<b>ROADWAY type 604-C with cover</b>							
15¾	19½	17½	8	24	1	60461	60450
24	28½	26	6	38	1½	60462	60451
24	28½	26	8	38	1½	60463	60452
26½	31	28¾	10	37	1¼	60464	60453
30	34½	32	8	44	1½	60465	60454
30	35½	32¾	12	46	1½	60466	60455
34	39½	36¾	11	46½	1½	60467	60456
36	41½	37¾	8	48	1½	60468	60457
36	42½	38¾	12	48	2	60469	60458
42	46¾	44½	10	58	3	60470	60459
48	53	49¾	10	57¾	1½	60471	60460

• May be varied as desired



# MANHOLE FRAMES COVERS GRATINGS

standard

## ● circular • for slab construction

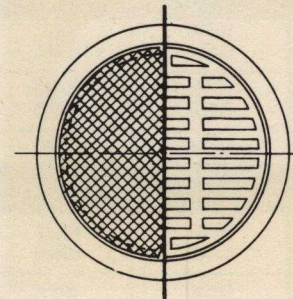
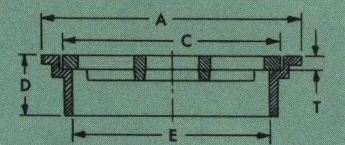
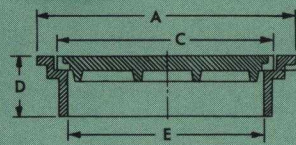


flanges may be increased to any desired square rectangle or circle; dimension D may be varied as desired

variations: 1, 3, 4, 5, 6, 7, 8, 9, 10, 18, 19 (page 2)

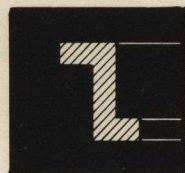
guarantee: ROADWAY types for 10 years

ordering: see page 2; also specify proper depth



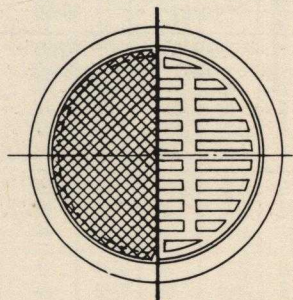
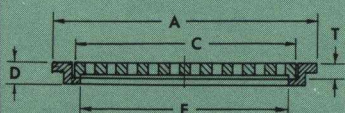
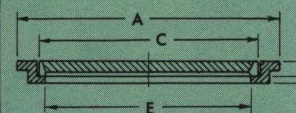
E	A	C	T	depth, D, in.					depth, D, in.				
				4½	6	8	10	12	4½	6	8	10	12
ROADWAY type 612-H				with cover					with plane grating				
6 9	12 15	8 11	1 1	61905 61915	61906 61916	61907 61917	61908 61918	61909 61919	61900 61910	61901 61911	61902 61912	61903 61913	61904 61914
12 16 18	19 22 24	14 18 19	1 1¼ 1¾	61925 61935 61945	61926 61936 61946	61927 61937 61947	61928 61938 61948	61929 61939 61949	61920 61930 61940	61921 61931 61941	61922 61932 61942	61923 61933 61943	61924 61934 61944
20 24	28½ 32½	23 26	1¼ 1½	61955 61965	61956 61966	61957 61967	61958 61968	61959 61969	61950 61960	61951 61961	61952 61962	61953 61963	61954 61964
30 36	36½ 42½	32 38	1½ 1½	61975 61985	61976 61986	61977 61987	61978 61988	61979 61989	61970 61980	61971 61981	61972 61982	61973 61983	61974 61984
42 48	50 56	44 50	1½ 1½	61995 63205	61996 63206	61997 63207	61998 63208	61999 63209	61990 63200	61991 63201	61992 63202	61993 63203	61994 63204
54 60	62 68	56 62	1½ 2	63215 63225	63216 63226	63217 63227	63218 63228	63219 63229	63210 63220	63211 63221	63212 63222	63213 63223	63214 63224
WALKWAY type 630-H				with cover					with plane grating				
6 9	12 15	8 11	1 1	62800 62810	62801 62811	62802 62812	62803 62813	62804 62814	62805 62815	62806 62816	62807 62817	62808 62818	62809 62819
12 16 18	19 22 24	14 18 19	1 1¼ 1¾	62820 62830 62840	62821 62831 62841	62822 62832 62842	62823 62833 62843	62824 62834 62844	62825 62835 62845	62826 62836 62846	62827 62837 62847	62828 62838 62848	62829 62839 62849
20 24	28½ 32½	23 26	1¼ 1½	62850 62860	62851 62861	62852 62862	62853 62863	62854 62864	62855 62865	62856 62866	62857 62867	62858 62868	62859 62869
30 36	36½ 42½	32 38	1½ 1½	62870 62880	62871 62881	62872 62882	62873 62883	62874 62884	62875 62885	62876 62886	62877 62887	62878 62888	62879 62889
42 48	50 56	44 50	1½ 1½	62890 62900	62891 62901	62892 62902	62893 62903	62894 62904	62895 62905	62896 62906	62897 62907	62898 62908	62899 62909
54 60	62 68	56 62	1½ 2	62910 62920	62911 62921	62912 62922	62913 62923	62914 62924	62915 62925	62916 62926	62917 62927	62918 62928	62919 62929

## ● circular • for slab construction



variations: 1, 3, 4, 5, 6, 9, 10, 15, 16, 18, 19 (page 2)

ordering: see page 2



E	A	C	D	T	plane		concave
WALKWAY type 621-Q					with cover	with grating	
6	10	7	1⅞	¾	60000	60002	60001
9	13	10	1⅞	¾	60003	60005	60004
12	16	13	1⅞	¾	60006	60008	60007
16	20¼	17	1⅞	¾	60009	60011	60010
18	22¼	19	1⅞	¾	60012	60014	60013
20	24	21	1⅞	1¼	60015	60017	60016
24	28	25	1⅞	1¼	60018	60020	60019
27	31	28¼	1⅞	1¼	60021	60023	60022
30	34½	31	1⅞	1¼	60024	60026	60025
32	38	34	2½	1½	60027	60029	60028
36	41	37¼	2	1¼	60030	60032	60031
42	47	43¼	2	1¼	60033	60035	60034
48	53	49¼	2	1¼	60036	60038	60037
54	59	55¼	2	1¼	60039	60041	60040



# MANHOLE FRAMES COVERS

watertight bolted

surface water only

single cover

## watertight castings

There are basically two types of watertight castings as detailed.

No. 1—bolted and gasketed

No. 2—sealed and locked

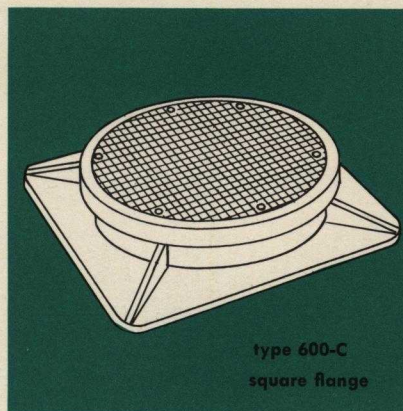
Bolted type—only one cover is used and water tightness is attained by the use of Silicon Bronze Cap Screws to compress the gasket.

Sealed and locked type—water tightness is attained by use of an inner cover and the gasket is compressed by the tightening of the lock bar.

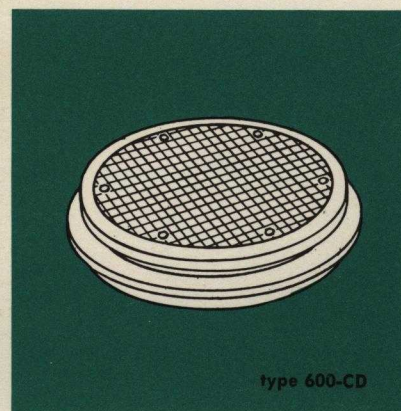
for square watertight castings see page 14

for rectangular watertight castings see pages 14, 15

for hydrostatic and gastight castings see page 9

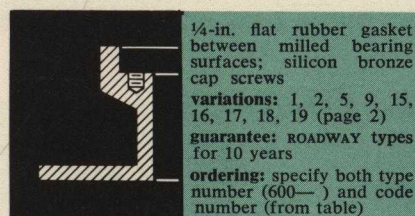


type 600-C  
square flange

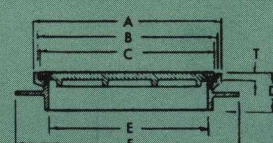
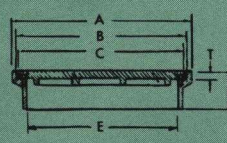
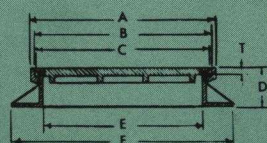


type 600-CD

## ● circular



1/4-in. flat rubber gasket between milled bearing surfaces; silicon bronze cap screws  
variations: 1, 2, 5, 9, 15, 16, 17, 18, 19 (page 2)  
guarantee: ROADWAY types for 10 years  
ordering: specify both type number (600—) and code number (from table)



for pit  
type 600-C

for slab  
type 600-CD

for waterproof slab  
type 600-CE

E	A	B	D*	F	C	T	for pit type 600-C				for slab type 600-CD		for waterproof slab type 600-CE			
							circular flange		square flange		roadway	walkway	circular flange		square flange	
							roadway	walkway	roadway	walkway			roadway	walkway	roadway	walkway
6	12	10	8	20	9 7/8	1 1/4	62000	62001	62002	62003	62004	62005	62006	62007	62008	62009
12	18	16	8	26	15 3/8	1 1/4	62010	62011	62012	62013	62014	62015	62016	62017	62018	62019
18	24	22	8	32	21 1/8	1 1/4	62020	62021	62022	62023	62024	62025	62026	62027	62028	62029
24	30	28	8	38	27 1/8	1 1/4	62030	62031	62032	62033	62034	62035	62036	62037	62038	62039
27	33	31	8	41	30 3/8	1 1/4	62040	62041	62042	62043	62044	62045	62046	62047	62048	62049
30	36	34	8	44	33 3/8	1 1/2	62050	62051	62052	62053	62054	62055	62056	62057	62058	62059
33	39	37	8	47	36 3/8	1 1/2	62060	62061	62062	62063	62064	62065	62066	62067	62068	62069
36	42	40	8	50	39 3/8	1 1/2	62070	62071	62072	62073	62074	62075	62076	62077	62078	62079
40	46	44	8	54	43 3/8	1 1/2	62080	62081	62082	62083	62084	62085	62086	62087	62088	62089
42	48	46	8	56	45 3/8	1 1/2	62090	62091	62092	62093	62094	62095	62096	62097	62098	62099
48	54	52	8	62	51 3/8	1 1/2	62100	62101	62102	62103	62104	62105	62106	62107	62108	62109
54	60	58	8	68	57 3/8	3	62110	62111	62112	62113	62114	62115	62116	62117	62118	62119
60	66	64	8	74	63 3/8	3	62120	62121	62122	62123	62124	62125	62126	62127	62128	62129

\* May be varied as desired

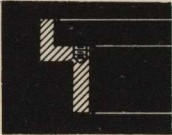
GUARANTEED CONSTRUCTION CASTINGS



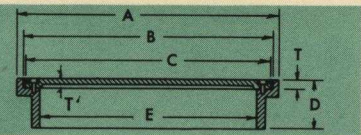
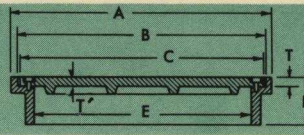
# MANHOLE FRAMES COVERS

watertight bolted

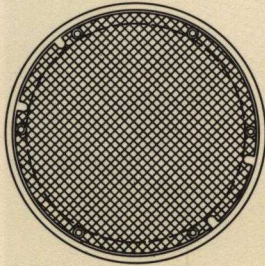
## ● circular



1/4-in. flat rubber gasket between milled bearing surfaces; silicon bronze cap screws  
T' depends on E  
variations: 1, 2, 5, 7, 9, 10, 12, 15, 16, 18, 19 (page 2)  
guarantee: ROADWAY types for ten years  
ordering: see page 2



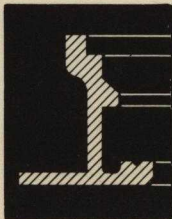
E   A   B   C   T					depth, D, in.					depth, D, in.				
					4½	6	8	10	12	4½	6	8	10	12
type 651-CD					ROADWAY					WALKWAY				
4	10	8	7¾	1¼	20700	20701	20702	20703	20704	20705	20706	20707	20708	20709
6	12	10	9¾	1¼	20710	20711	20712	20713	20714	20715	20716	20717	20718	20719
10	18	14	13¾	1¼	20720	20721	20722	20723	20724	20725	20726	20727	20728	20729
12	18	16	15¾	1¼	20730	20731	20732	20733	20734	20735	20736	20737	20738	20739
15	21	19	18¾	1¼	20740	20741	20742	20743	20744	20745	20746	20747	20748	20749
18	24	22	21¾	1¼	20750	20751	20752	20753	20754	20755	20756	20757	20758	20759
20	26	24	23¾	1¼	20760	20761	20762	20763	20764	20765	20766	20767	20768	20769
22	28	26	25¾	1¼	20770	20771	20772	20773	20774	20775	20776	20777	20778	20779
24	30	28	27¾	1¼	20780	20781	20782	20783	20784	20785	20786	20787	20788	20789
27	33	31	30¾	1¼	20790	20791	20792	20793	20794	20795	20796	20797	20798	20799
30	36	34	33¾	1½	20800	20801	20802	20803	20804	20805	20806	20807	20808	20809
33	39	37	36¾	1½	20810	20811	20812	20813	20814	20815	20816	20817	20818	20819
36	42	40	39¾	1½	20820	20821	20822	20823	20824	20825	20826	20827	20828	20829
40	46	44	43¾	1½	20830	20831	20832	20833	20834	20835	20836	20837	20838	20839
42	48	48	45¾	1½	20840	20841	20842	20843	20844	20845	20846	20847	20848	20849
45	51	49	48¾	1½	20850	20851	20852	20853	20854	20855	20856	20857	20858	20859
48	54	52	51¾	1½	20860	20861	20862	20863	20864	20865	20866	20867	20868	20869
54	60	58	57¾	3	20870	20871	20872	20873	20874	20875	20876	20877	20878	20879
60	66	64	63¾	3	20880	20881	20882	20883	20884	20885	20886	20887	20888	20889



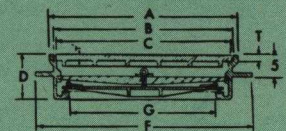
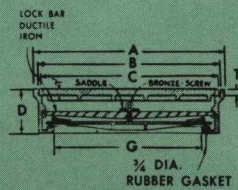
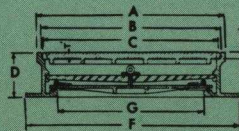
# MANHOLE FRAMES COVERS

watertight sealed and locked  
double cover

## ● circular



¾-in. diameter rubber gasket; silicon bronze eye bolt; ductile iron locking bar  
variations: when specified, both covers may be made in two concentric parts; 1, 3, 4, 5, 6, 9, 13, 14, 15, 16, 18, 19 (page 2)  
guarantee: ROADWAY types for 10 years  
ordering: see page 2



								for pit type 601-A				for slab type 601-RA				for waterproof slab type 601-SA			
frame								circular flange		square flange						circular flange		square flange	
G	A	B	D	F	C	T		roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway
6	16¼	13¼	10	23	13	1¼		62300	62301	62302	62303	62304	62305	62306	62307	62308	62309		
12	22¼	19¼	10	29	19	1¼		62310	62311	62312	62313	62314	62315	62316	62317	62318	62319		
20	30¼	27¼	10	37	27	1¼		62320	62321	62322	62323	62324	62325	62326	62327	62328	62329		
24	34¼	31¼	10	40½	31½	1¼		62330	62331	62332	62333	62334	62335	62336	62337	62338	62339		
27	36½	33½	11	43½	33¼	1½		62340	62341	62342	62343	62344	62345	62346	62347	62348	62349		
30	39½	36½	11	46½	36¼	1½		62350	62351	62352	62353	62354	62355	62356	62357	62358	62359		
31	41¼	38¼	11	47	38	1½		62360	62361	62362	62363	62364	62365	62366	62367	62368	62369		
36	47	44	10	52½	43½	1½		62370	62371	62372	62373	62374	62375	62376	62377	62378	62379		
40	51	48	10	55½	47½	1½		62380	62381	62382	62383	62384	62385	62386	62387	62388	62389		
42	53	50	10	57½	49½	1½		62390	62391	62392	62393	62394	62395	62396	62397	62398	62399		
48	58	55	10	63	54½	1½		62400	62401	62402	62403	62404	62405	62406	62407	62408	62409		
54	64½	61½	10	68	61	3		62410	62411	62412	62413	62414	62415	62416	62417	62418	62419		
60	70½	67½	10	74	67	3		62420	62421	62422	62423	62424	62425	62426	62427	62428	62429		



# MANHOLE FRAMES COVERS

hydrostatic and gas pressure tight double cover

## ● circular

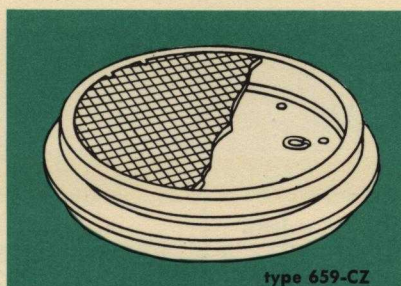
1-in. diameter holes in flange for anchor bolts, number as required (provision should be made for anchoring frame flange to structure)

frame: cast iron

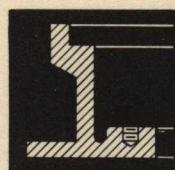
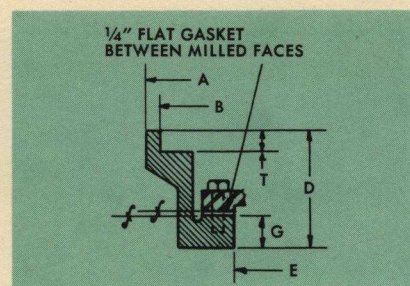
variations: 1, 2, 5, 6, 7, 9, 12, 14, 15, 16, 18 (page 2)

guarantee: ROADWAY types for 10 years

ordering: see page 2



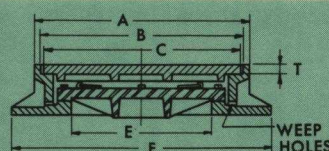
type 659-CZ



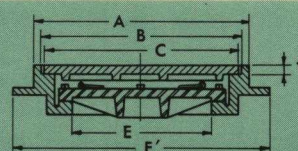
## hydrostatic pressure

dimensions based on 250 psi

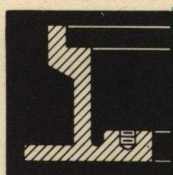
E	A	B	C	F	F'	G	T	for pit type 659-CX		for waterproof slab type 659-CZ	
								circular flange	square flange	circular flange	square flange
								roadway	walkway	roadway	walkway
18	30	28	27 3/4	34	38	2	1 1/4	22040	22041	22042	22043
21	33	31	30 3/4	37	41	2	1 1/4	22050	22051	22052	22053
24	36	34	33 3/4	40	44	2 1/4	1 1/2	22060	22061	22062	22063
27	39	37	36 3/4	43	47	2 1/4	1 1/2	22070	22071	22072	22073
30	42	40	39 3/4	46	50	2 1/4	1 1/2	22080	22081	22082	22083
33	46	44	43 3/4	50	54	2 1/2	1 1/2	22090	22091	22092	22093
35	48	46	45 3/4	52	56	2 1/2	1 1/2	22100	22101	22102	22103
37	51	49	48 3/4	55	59	2 1/2	1 1/2	22110	22111	22112	22113
40	54	52	51 3/4	58	62	3	2 1/2	22120	22121	22122	22123
46	60	58	57 3/4	64	68	3	2 1/2	22130	22131	22132	22133
52	66	64	63 3/4	70	74	3	2 1/2	22140	22141	22142	22143
										22046	22047
										22056	22057
										22066	22067
										22076	22077
										22086	22087
										22096	22097
										22106	22107
										22116	22117
										22126	22127
										22136	22137
										22146	22147
										22048	22049
										22058	22059
										22068	22069
										22078	22079
										22088	22089
										22098	22099
										22108	22109
										22118	22119
										22128	22129
										22138	22139
										22148	22149



for pit  
type 659-CX



for waterproof slab  
type 659-CZ



## gas pressure

dimensions based on  
45 psi uplift pressure

▲ E	A	B	C	F	F'	G	T	for pit type 464-CX		for waterproof slab type 464-CZ		for slab type 464-CY	
								circular flange	square flange	circular flange	square flange	roadway	walkway
								roadway	walkway	roadway	walkway	roadway	walkway
18	30	28	27 3/4	34	38	2	1 1/4	36790	36791	36792	36793	36794	36795
21	33	31	30 3/4	37	41	2	1 1/4	36800	36801	36802	36803	36804	36805
24	36	34	33 3/4	40	44	2 1/4	1 1/2	36810	36811	36812	36813	36814	36815
27	39	37	36 3/4	43	47	2 1/4	1 1/2	36820	36821	36822	36823	36824	36825
30	42	40	39 3/4	46	50	2 1/4	1 1/2	36830	36831	36832	36833	36834	36835
33	46	44	43 3/4	50	54	2 1/2	1 1/2	36840	36841	36842	36843	36844	36845
35	48	46	45 3/4	52	56	2 1/2	1 1/2	36850	36851	36852	36853	36854	36855
37	51	49	48 3/4	55	59	2 1/2	1 1/2	36860	36861	36862	36863	36864	36865
40	54	52	51 3/4	58	62	3	2 1/2	36870	36871	36872	36873	36874	36875
46	60	58	57 3/4	64	68	3	2 1/2	36880	36881	36882	36883	36884	36885
52	66	64	63 3/4	70	74	3	2 1/2	36890	36891	36892	36893	36894	36895
										36796	36797	36798	36799
										36806	36807	36808	36809
										36816	36817	36818	36819
										36826	36827	36828	36829
										36836	36837	36838	36839
										36846	36847	36848	36849
										36856	36857	36858	36859
										36866	36867	36868	36869
										36876	36877	36878	36879
										36886	36887	36888	36889
										36896	36897	36898	36899

▲ both covers: E 40 in. and smaller, cast iron; E over 40 in., ductile iron

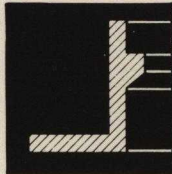
GUARANTEED CONSTRUCTION CASTINGS



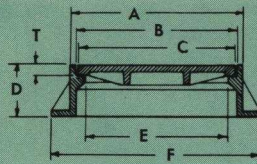
# MANHOLE FRAMES COVERS

standard

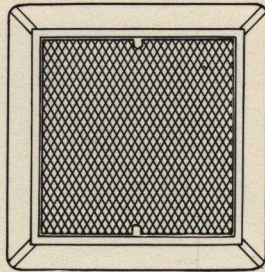
■ square • for pit construction



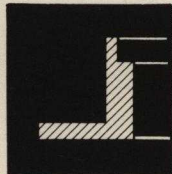
depth of casting and flange dimensions may be varied as desired; lock operated if specified  
variations: 1, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16 (page 2)  
ordering: see page 2



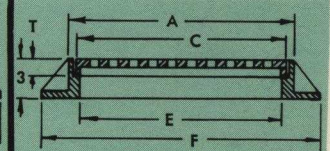
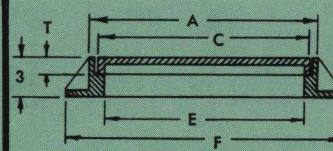
frame					cover			frame					cover		
E	D	F	A	B	C	T		E	D	F	A	B	C	T	
<b>ROADWAY type 290-D with cover</b>															
6	5	14	9 1/4	8	7 1/4	1	26930	24	6	33	27 1/4	26	25 1/4	1 1/4	35108
8 1/2	5	13 3/4	11 1/4	10 1/4	10	2 5/8	37885	24	8	35	27 1/2	26	25 3/4	1 1/2	26393
9 1/2	9 1/2	21 1/2	12 1/2	11 1/2	11 1/4	3	25406	26	10	36	29	27 1/2	27 1/4	3	35800
11 1/2	9	20	14	13 3/4	13	2 1/2	25404	27 1/2	11 1/2	40	32	30	29 1/2	1 3/8	25597
16	5	26	19 1/2	18	17 3/4	1 1/4	29655	30	6 1/4	41	33 3/4	32 1/4	32	2	39635
18	6	28	21 3/4	20	19 3/4	2	33916	32	4	44	36	34 1/4	34	1	28238
18	8	32	21 3/4	20	19 3/4	2	34968	34	7	44	37 3/4	36	35 1/4	1 1/2	35726
21 1/4	8	36	25 3/4	24	23 3/4	1 1/2	29595	34	8 1/2	46	38 1/4	36 1/4	36	1 1/4	26338
22	4 1/2	33 1/2	26 1/4	24 1/4	24	1 3/4	29679	36	7	46	40	38	37 3/4	1 1/2	20303
22	5	32 1/4	26 3/4	24 3/4	24	1 3/4	23994	36	8	48	40	38	37 3/4	1 1/2	39636
22	6	36	27	24 1/4	24	1 3/8	34921	40	5	50	44	42	41 3/4	1 1/2	18706
22	8	40	27	24 1/4	24	1 3/4	25914	42	5	52	46	44	43 3/4	1 1/2	18707
23	4	36 1/4	25 1/4	24 1/4	24	1 1/4	30411	48	5	57	52	50	49 3/4	1 1/2	26021
24	6	28	21 3/4	20	19 3/4	2	33679	48	8	58	52	50	49 3/4	1 1/2	39367



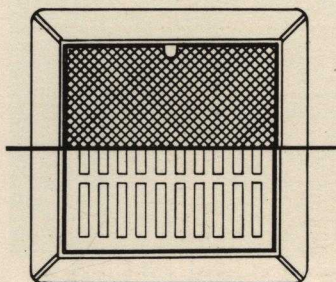
■ square • for pit construction



depth of casting and flange dimensions may be varied as desired.  
variations: 1, 3, 4, 5, 6, 15, 16, 18, 19 (page 2)  
ordering: see page 2



E	A	F	C	T		
<b>WALKWAY type 619-E</b>					with cover	with plane grating
6	8 1/2	12	7 1/4	1 1/4	61201	61200
8	10 1/2	14	9 1/4	1 1/4	61203	61202
10	12 1/2	16	11 1/4	1 1/2	61205	61204
12	14 1/2	18	13 3/4	1 1/2	61207	61206
14	16 1/2	20	15 1/4	1 1/2	61209	61208
16	18 1/2	22	17 1/4	1 1/2	61211	61210
18	20 1/2	24	19 1/4	1 1/2	61213	61212
20	22 1/2	26	21 1/4	1 1/2	61215	61214
22	24 1/2	28	23 3/4	1 1/2	61217	61216
24	26 1/2	30	25 1/4	1 1/2	61219	61218
26	29	32	27 1/4	1 1/2	61221	61220
28	31	34	29 1/4	1 1/2	61223	61222
30	33	36	31 1/4	1 1/2	61225	61224
32	35	38	33 3/4	1 1/2	61227	61226
34	37	40	35 1/4	1 1/2	61229	61228
36	39	42	37 1/4	1 1/2	61231	61230
42	45	48	43 3/4	1 1/2	61233	61232
48	51	54	49 3/4	1 1/2	61235	61234
54	57	60	55 1/4	1 1/2	61237	61236
60	63	66	61 1/4	1 1/2	61239	61238
66	69	72	67 1/4	1 1/2	61241	61240
72	75	78	73 1/4	1 1/2	61243	61242

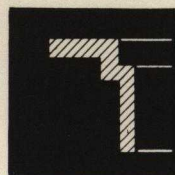




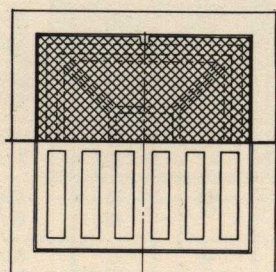
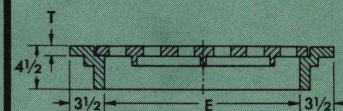
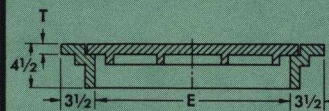
# MANHOLE FRAMES COVERS

standard

■ square • for slab construction

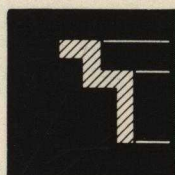


depth of casting may be varied as desired  
variations: 1, 3, 4, 5, 6, 9, 10, 15, 16  
(page 2)  
ordering: see page 2

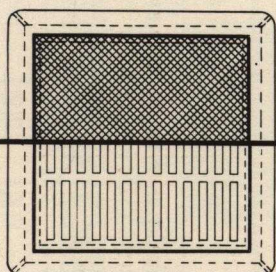
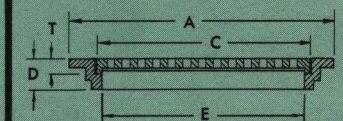
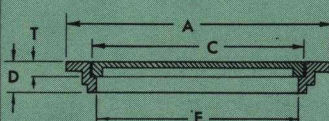


clear opening			
E	T		
ROADWAY type 613-H		with cover	with plane grating
6	1	61894	61895
12	1	61880	61887
16	1	61881	61888
20	1	61882	61889
24	1 1/4	61883	61890
27	1 1/4	61896	61897
30	1 1/4	61884	61891
36	1 1/2	61885	61892
42	2 1/2	61886	61893
48	3	61898	61899

■ square • for slab construction



depth of casting and flange dimensions  
may be varied as desired.  
variations: 1, 3, 4, 5, 6, 7, 8, 15, 16, 18,  
19 (page 2)  
ordering: see page 2



E	A	D*	C	T		
WALKWAY type 622-H					with cover	with plane grating
6	12	3	7¼	1¼	61351	61350
8	14	3	9¼	1¼	61353	61352
10	16	3	11¼	1½	61355	61354
12	18	3	13¼	1½	61357	61356
14	20	3	15¼	1½	61359	61358
16	22	3	17¼	1½	61361	61360
18	24	3	19¼	1½	61363	61362
20	26	3	21¼	1½	61365	61364
22	28	3	23¼	1½	61367	61366
24	30	3	25¼	1½	61369	61368
26	32	3	27¼	1½	61371	61370
28	34	3	29¼	1½	61373	61372
30	36	3	31¼	1½	61375	61374
32	38	3	33¼	1½	61377	61376
34	40	3	35¼	1½	61379	61378
36	42	3	37¼	1½	61381	61380
42	48	3	43¼	1½	61383	61382
48	54	3	49¼	1½	61385	61384
54	60	4	55¼	1½	61387	61386
60	66	4	61¼	1½	61389	61388
66	72	4	67¼	1½	61391	61390
72	78	4	73¼	1½	61393	61392

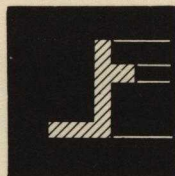
\*May be varied as desired.



# MANHOLE FRAMES COVERS

standard

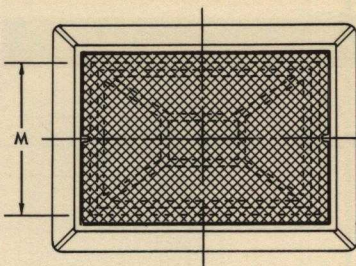
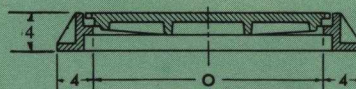
## rectangular • for pit construction



depth of casting and flange dimensions may be varied as desired; cover dimensions are 2 in. longer than dimensions M and O

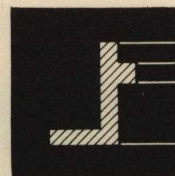
variations: 1, 3, 4, 5, 6, 15, 16, 18, 19 (page 2)

guarantee: ten years  
ordering: see page 2



clear opening			clear opening			clear opening		
M	O		M	O		M	O	
ROADWAY type 610-E with cover								
10	15 20	60700 60701	24	36 48	60714 60715	38	57 76	60728 60729
12	18 24	60702 60703	26	39 52	60716 60717	40	60 80	60730 60731
14	21 28	60704 60705	28	42 56	60718 60719	42	63 80	60732 60733
16	24 32	60706 60707	30	45 60	60720 60721	44	66 80	60734 60735
18	27 36	60708 60709	32	48 64	60722 60723	46	69 80	60736 60737
20	30 40	60710 60711	34	51 68	60724 60725	48	72 80	60738 60739
22	33 44	60712 60713	36	54 72	60726 60727			

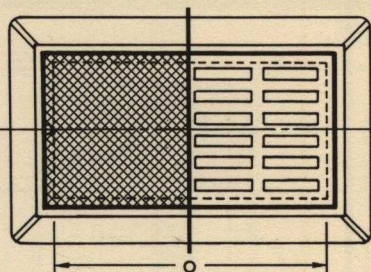
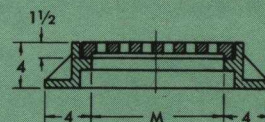
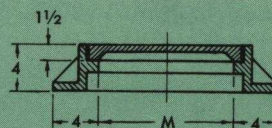
## rectangular • for pit construction



depth of casting and flange dimensions may be varied as desired; lock operated when specified

variations: 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16 (page 2)

ordering: see page 2



M	O	cover	grating	M	O	cover	grating	M	O	cover	grating
WALKWAY type 620-E with cover or plane grating											
10	15 20 30 40	61250 61270 22900 22902	62950 62970 ... ...	24	36 48 72 96	61257 61277 22928 22930	62957 62977 ... ...	38	57 76 114 152	61264 61284 22956 22958	62964 62984 ... ...
12	18 24 36 48	61251 61271 22904 22906	62951 62971 ... ...	26	39 52 78 104	61258 61278 22932 22934	62958 62978 ... ...	40	60 80 120 160	61265 61285 22960 22962	62965 62985 ... ...
14	21 28 42 56	61252 61272 22908 22910	62952 62972 ... ...	28	42 56 84 112	61259 61279 22936 22938	62959 62979 ... ...	42	63 80 126 160	61266 61286 22964 22966	62966 62986 ... ...
16	24 32 48 64	61253 61273 22912 22914	62953 62973 ... ...	30	45 60 90 120	61260 61280 22940 22942	62960 62980 ... ...	44	66 80 132 160	61267 61287 22968 22970	62967 62987 ... ...
18	27 36 54 72	61254 61274 22916 22918	62954 62974 ... ...	32	48 64 96 128	61261 61281 22944 22946	62961 62981 ... ...	46	69 80 138 160	61268 61288 22972 22974	62968 62988 ... ...
20	30 40 60 80	61255 61275 22920 22922	62955 62975 ... ...	34	51 68 102 136	61262 61282 22948 22950	62962 62982 ... ...	48	72 80 144 160	61269 61289 22976 22978	62969 62989 ... ...
22	33 44 66 88	61256 61276 22924 22926	62956 62976 ... ...	36	54 72 108 144	61263 61283 22952 22954	62963 62983 ... ...				



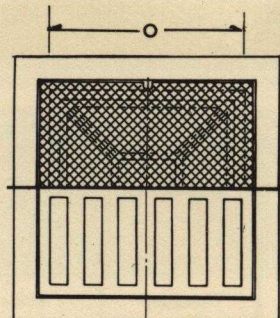
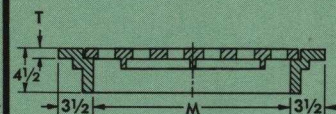
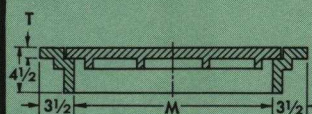
# MANHOLE FRAMES COVERS

standard

## rectangular • for slab construction



depth of casting and flange dimensions may be varied as desired; cover dimensions are 2 in. longer than dimensions M and O  
 variations: 1, 3, 4, 5, 6, 7, 8, 15, 16, 18, 19 (page 2)  
 guarantee: ten years  
 ordering: see page 2



clear opening		T
M	O	

### ROADWAY type 613-H

12	18 24	1 1
16	24 32	1 1
20	30 40	1 1/4 1 1/4
24	36 48	1 1/4 1 1/4
30	45 60	1 1/2 1 1/2
36	54 72	1 1/2 1 1/2

### with cover

60800
60801
60802
60803
60804
60805
60806
60807
60808
60809
60810
60811

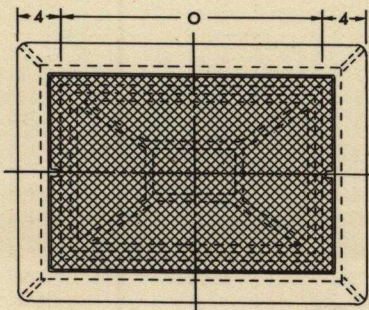
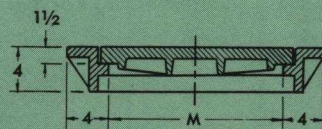
### with plane grating

60812
60813
60814
60815
60816
60817
60818
60819
60820
60821
60822
60823

## rectangular • for slab construction



variations: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 18 (page 2)  
 ordering: see page 2  
 depth of casting may be varied as desired



clear opening	
M	O

### WALKWAY type 623-P with cover

10	15 20	60830 60831	30	45 60	60850 60851
12	18 24	60832 60833	32	48 64	60852 60853
14	21 28	60834 60835	34	51 68	60854 60855
16	24 32	60836 60837	36	54 72	60856 60857
18	27 36	60838 60839	38	57 76	60858 60859
20	30 40	60840 60841	40	60 80	60860 60861
22	33 44	60842 60843	42	63 80	60862 60863
24	36 48	60844 60845	44	66 80	60864 60865
26	39 52	60846 60847	46	69 80	60866 60867
28	42 56	60848 60849	48	72 80	60868 60869

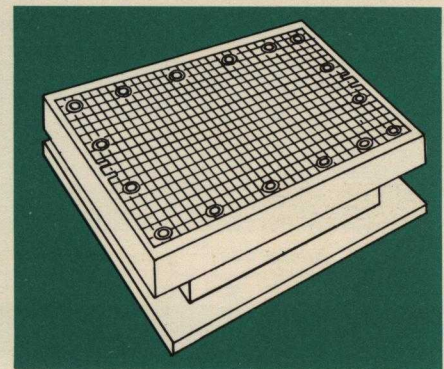
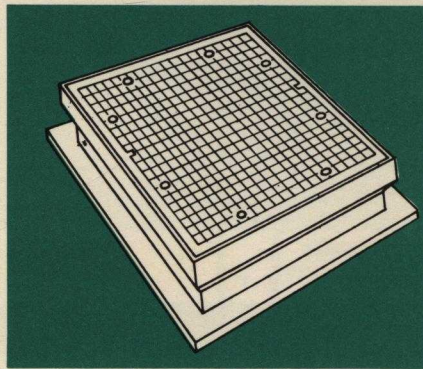


# MANHOLE FRAMES COVERS

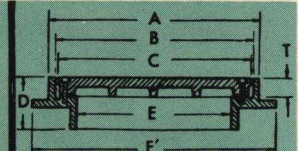
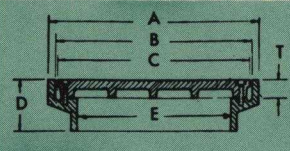
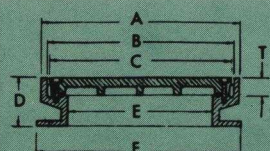
watertight

surface water only  
single cover

■ square



¾-in. diameter rubber gasket; silicon bronze cap screw  
variations: 1, 2, 3, 4, 5, 7, 9, 15, 16, 18, 19 (page 2)  
guarantee: ROADWAY types for 10 years  
ordering: see page 2



E	A	B	C	F'	F	D	T	roadway	walkway	roadway	walkway	roadway	walkway
								for pit type 640-C		for slab type 640-CD		for waterproof slab type 640-SR	
6	15	13	12¾	20	16	8	3	24900	24901	24902	24903	24904	24905
12	21	19	18¾	26	22	8	3	24906	24907	24908	24909	24910	24911
18	27	25	24¾	32	28	8	3	24912	24913	24914	24915	24916	24917
20	29	27	26¾	34	30	8	3	24918	24919	24920	24921	24922	24923
24	33	31	30¾	38	34	8	3	24924	24925	24926	24927	24928	24929
27	36	34	33¾	41	37	8	3	24930	24931	24932	24933	24934	24935
30	39	37	36¾	44	40	8	3	24936	24937	24938	24939	24940	24941
33	42	40	39¾	47	43	8	3	24942	24943	24944	24945	24946	24947
36	45	43	42¾	50	46	8	3	24948	24949	24950	24951	24952	24953
42	51	49	48¾	56	52	8	3	24954	24955	24956	24957	24958	24959
48	57	55	54¾	62	58	8	3	24960	24961	24962	24963	24964	24965
54	63	61	60¾	68	64	8	3	24966	24967	24968	24969	24970	24971
60	69	67	66¾	74	70	8	3	24972	24973	24974	24975	24976	24977

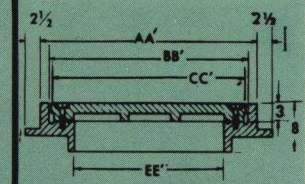
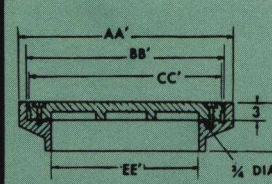
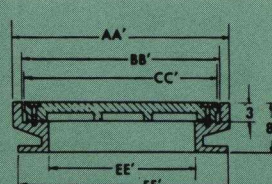
• May be varied as desired

■ Refers to type 640-SR only

■ rectangular



¾-in. diameter rubber gasket; silicon bronze cap screws  
variations: 1, 3, 4, 5, 9, 15, 16, 18, 19 (page 2)  
guarantee: ROADWAY types for 10 years  
ordering: see page 2



E	E'	A	A'	B	B'	C	C'	F	F'	roadway	walkway	roadway	walkway	roadway	walkway
										for pit type 656-C		for slab type 656-CD		for waterproof slab type 656-SR	
6	12	15	21	13	19	12¾	18¾	16	22	22600	22601	22602	22603	22604	22605
12	24	21	33	19	31	18¾	30¾	22	34	22606	22607	22608	22609	22610	22611
18	36	27	45	25	43	24¾	42¾	28	46	22612	22613	22614	22615	22616	22617
20	40	29	49	27	47	26¾	46¾	30	50	22618	22619	22620	22621	22622	22623
24	48	33	57	31	55	30¾	54¾	34	58	22624	22625	22626	22627	22628	22629
27	54	36	63	34	61	33¾	60¾	37	64	22630	22631	22632	22633	22634	22635
30	60	39	69	37	67	36¾	66¾	40	70	22636	22637	22638	22639	22640	22641
33	66	42	75	40	73	39¾	72¾	43	76	22642	22643	22644	22645	22646	22647
36	72	45	81	43	79	42¾	78¾	46	82	22648	22649	22650	22651	22652	22653
40	80	49	89	47	87	46¾	86¾	50	90	22654	22655	22656	22657	22658	22659
42	84	51	93	49	91	48¾	90¾	52	94	22660	22661	22662	22663	22664	22665
48	96	57	105	55	103	54¾	102¾	58	106	22666	22667	22668	22669	22670	22671
54	108	63	117	61	115	60¾	114¾	64	118	22672	22673	22674	22675	22676	22677
60	120	69	129	67	127	66¾	126¾	70	130	22678	22679	22680	22681	22682	22683

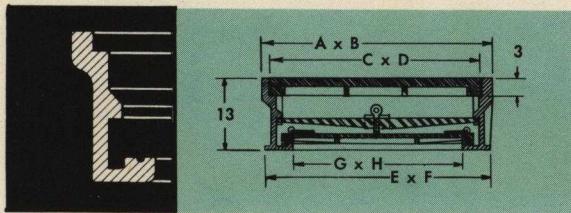


# MANHOLE FRAMES COVERS

watertight

surface water only  
sealed and locked double cover

■ rectangular • for pit construction



3/4-in. diameter rubber gasket; silicon bronze eye bolts;  
ductile iron locking bar

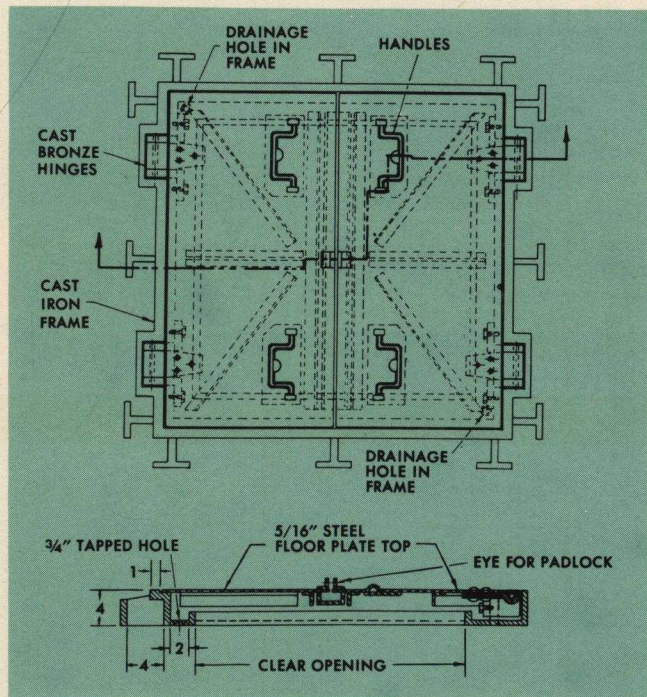
variations: 1, 2, 3, 4, 5, 7, 9, 15, 16, 18, 19 (page 2)

guarantee: ROADWAY types for 10 years

ordering: see page 2

opening, in.		A	B	E	F	C	D	roadway	walkway
G	H								
type 641 with cover									
6	9	17	20	16	19	13 3/4	16 3/4	24500	24501
12	18	23	29	22	28	19 3/4	25 3/4	24506	24507
18	27	29	38	28	37	25 3/4	34 3/4	24512	24513
20	30	31	41	30	40	27 3/4	37 3/4	24518	24519
24	36	35	47	34	46	31 3/4	43 3/4	24524	24525
27	40 1/2	38	51 1/2	37	50 1/2	34 3/4	48 3/4	24530	24531
30	45	41	56	40	55	37 3/4	52 3/4	24536	24537
33	49 1/2	44	60 1/2	43	59 1/2	40 3/4	57 3/4	24542	24543
36	54	47	65	46	64	43 3/4	61 3/4	24548	24549
40	60	51	71	50	70	47 3/4	67 3/4	24554	24555
42	63	53	74	52	73	49 3/4	70 3/4	24560	24561
48	72	59	83	58	82	55 3/4	79 3/4	24566	24567
54	81	65	92	64	91	61 3/4	88 3/4	24572	24573
60	90	71	101	70	100	67 3/4	97 3/4	24578	24579

■ square or ■ rectangular



variations: provision for internal lock; special sizes as required; ROADWAY installation data on request

ordering: specify both type number (670) and code number (from table); state number of door panels required and sides on which hinges are located; state variations, if any, required

opening, in.		plate cover		opening, in.		plate cover	
		steel	aluminum			steel	aluminum
WALKWAY type 670 with hinged plate covers							
24	24	33650	16500	54	54	33665	16515
	36	33651	16501		81	33666	16516
	48	33652	16502		108	33667	16517
30	30	33653	16503	60	60	33668	16518
	45	33654	16504		90	33669	16519
	60	33655	16505		120	33670	16520
36	36	33656	16506	66	66	33671	16521
	54	33657	16507		99	33672	16522
	72	33658	16508		132	33673	16523
42	42	33659	16509	72	72	33674	16524
	63	33660	16510		108	33675	16525
	84	33661	16511		144	33676	16526
48	48	33662	16512				
	72	33663	16513				
	96	33664	16514				

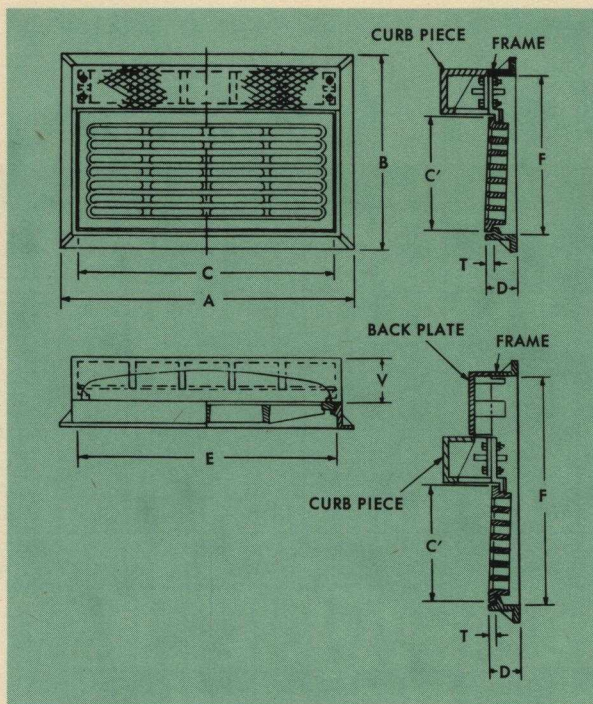
GUARANTEED CONSTRUCTION CASTINGS



# CATCH BASIN FRAMES GRATINGS curb, standard

## curb

### plane grating



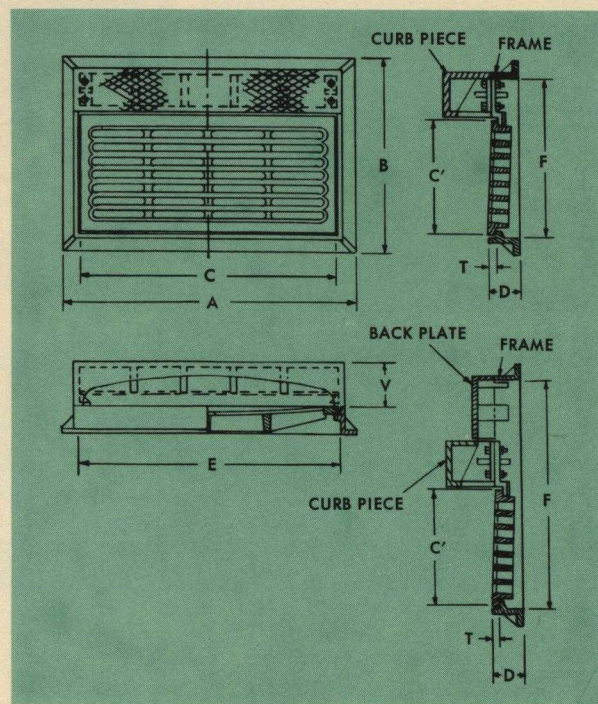
dimension V generally 2 in. greater than adjacent curb depth—but may be varied as required

curb inlet with circular base also available

guarantee: ten years

ordering: specify both type number (683), curb height, V, and code number (from table)

### concave grating

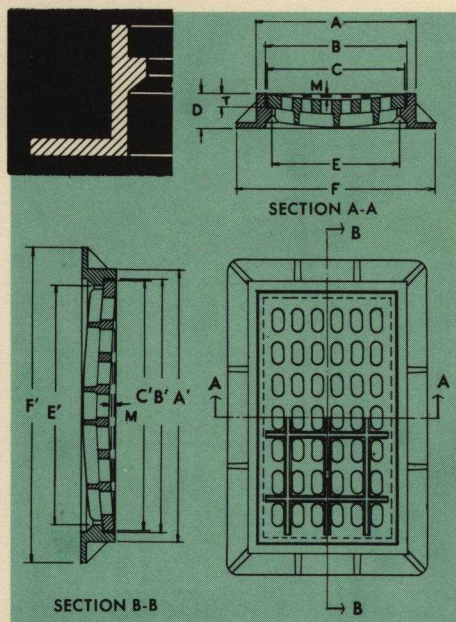


frame					grating			area grate opening sq. in.	code no.	
E	F	A	B	D	C	C'	T		plane grating	concave grating
ROADWAY type 683 without back plate										
30	30	36	36	5½	29¾	21¾	1¼	210	60280	60288
36	27½	36	35¾	6½	35	21¾	1¼	240	60281	60289
48	29	54	37	6½	47¾	21¾	1¼	400	60282	60290
49	36	55½	42¾	5	49½	29¾	1	630	60283	60291
48	50	54	56	5	47¾	43½	1¼	800 ▲	60284	60292
ROADWAY type 683 with back plate										
25½	27½	37	39½	6½	24	18¾	2½	145	60285	60293
36	34¾	43	43	6½	35	21¾	1¼	240	60286	60294
48	42	54	48	6½	47¾	21¾	1¼	400	60287	60295

▲ grating in two parts

## standard

### rectangular



frame								grating							total open area	code no.
E	E'	D	F	F'	A	A'	B	B'	C	C'	T	M	size openings	no. opngs		
ROADWAY Type 339-D with concave grating																
12½	17½	4	20	x25	15¾x20¾	14¼x19	14	x18¾	1½	¾	1½	"x1¾"	18	31	38458	
14	26	6½	23¾	x35¾	17½x29½	16	x28	15¾x27¾	2	¾	1½	"x3½"	24	139	29483	
17	22½	4½	27	x32½	20¾x26	19¼x24½	18¾	x24	2	½	1½	"x3¾"	30	249	29417	
19	32	4	28	x41¾	22¼x35¾	20¾x34¾	20½	x34¾	2¾	¾	2"	x3½"	42	258	35194	
19	35	5½	30¼	x46½	24¼x40½	21¼x37½	21	x37¼	2	1	1½	"x3½"	42	233	29480	
19	45	5	28	x54	23½x49½	22	x48	21½x47½	1¼	1¼	2"	x3"	60	308	25101	
19	45	5	28	x54	23¼x49½	22	x48	21¼x47¾	3	1¼	2"	x3"	60	308	22516	
19½	33½	5	28	x42	23½x37½	22	x36	21¾x35¾	1¼	¾	2"	x4¼"	36	274	21686	
19½	36	5	30½	x46¾	24½x40¾	21¾x38¾	21½	x38	2	¾	1½	"x3¾"	49	280	26118	
20	34	5½	28	x42	23½x37½	22	x36	21½x35½	1¼	¾	2"	x4¼"	36	274	20246	
21	27	3	27½	x34	25¼x31¾	23	x29½	22¾x29¼	2						26447	
24	34	4¼	32	x42¼	28¾x38¾	26½x36¾	26¼	x36	3		1½	"x3¾"	49	219	26219	
27	46½	5	36	x55½	32	x51½	30	x49½	29¾x49¼	3	1½	1½	"x3¾"	80	370	22517
27	47	5	36	x55½	32	x51½	30	x49½	29½x49	1	1½	1½	"x3¾"	80	370	25115
33	39	5	43	x49	36¼x43¾	35¼x42¼	35	x42	1¼		1½	"x3¾"	42	222	26117	
42½	45	5	49¾	x54	45½x49½	44	x48	43¾x47¾	1¼		2"	x3½"	120	736	26119	



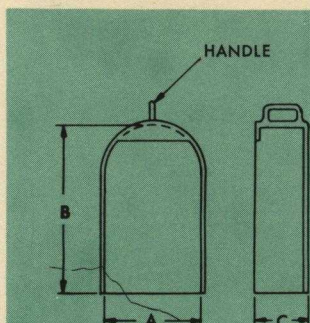
# CATCH BASIN TRAPS

standard, gas tight

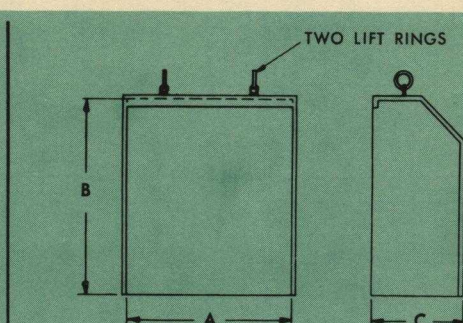
## standard

### hood detail

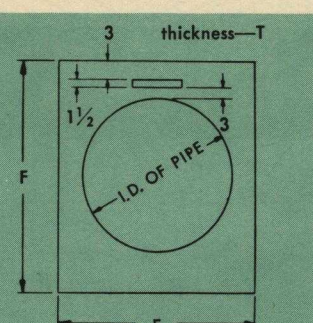
for pipe sizes to 20 in.



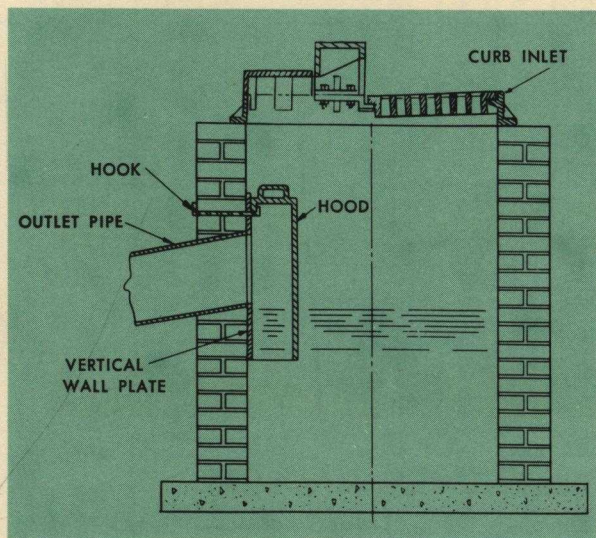
for pipe sizes 22 in. and over



### detail vertical wall plate

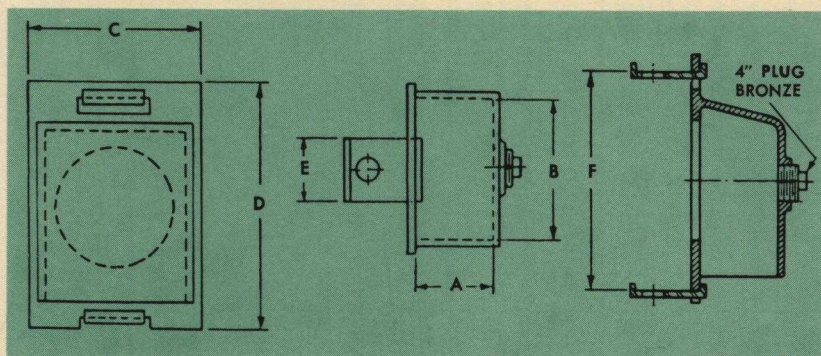


## installation of trap with curb inlet



pipe size	hood			vertical wall plate			code no.	
	A	B	C	E	F	T	with vertical plate	without vertical plate
<b>type 1168</b>								
4	6	12	3	8	15	5/8	30133	30134
6	8 1/2	15	4	10 1/2	20	5/8	19706	19707
8	11 1/2	20 1/2	5 1/2	13 1/2	23 1/2	5/8	26714	26721
10	13 3/4	23 1/2	6 1/2	15 3/4	26 1/2	5/8	26715	26722
12	15 3/4	26	7 1/2	17 3/4	29	5/8	26716	26723
15	18	27	9	20	30	3/4	26717	26724
18	21 1/4	27 3/4	12 3/4	23 1/2	32 1/4	3/8	19708	19709
20	25 1/4	29 3/4	14 3/4	27 1/4	32 1/4	7/8	26719	26726
22	26 3/4	31 1/4	15	29	36 3/4	7/8	19710	19711
24	30 1/2	33 3/4	15	32 3/4	36 3/4	7/8	19697	21628
27	30 1/2	36 3/4	19 3/4	33	42 1/4	1	19712	19713
30	35	39 3/4	21	37	42 1/4	1	19701	22998
33	40 1/2	42 1/4	22	43	47 1/4	1	19714	19715
36	50	44 1/4	21 1/8	52	47 1/4	1	19702	22999

## gas tight

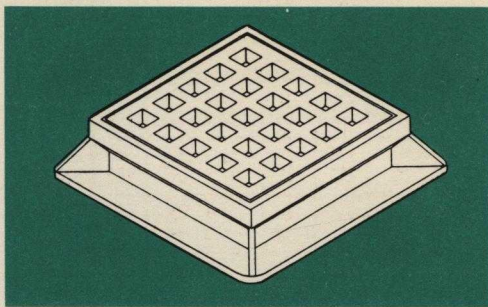


pipe size	A	B	C	D	E	F	code no.
<b>type 520</b>							
4	3	6	10	20	6	16 1/2	38100
6	4	9	13	22	6	18 1/2	38101
8	5	12	16	24	8	20 1/2	38102
10	6	14	18	26	8	22 1/2	38103
12	8	16	20	28	8	24 1/2	38104
15	10	18	22	31	8	27 1/2	38105
18	12	24	29	34	10	30 1/2	38106
21	12	30	35	37	10	33 1/2	38107
24	15	32	37	40	12	36 1/2	38108
27	15	40	45	43	12	39 1/2	38109
30	15	48	54	46	12	42 1/2	38110

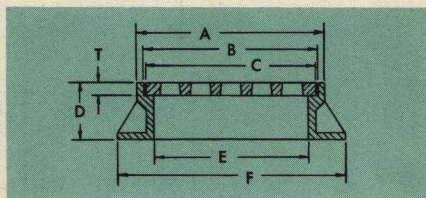
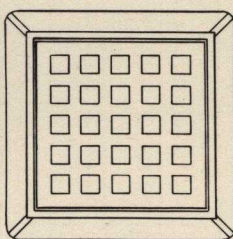
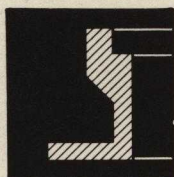
ordering: see page 2

GUARANTEED CONSTRUCTION CASTINGS





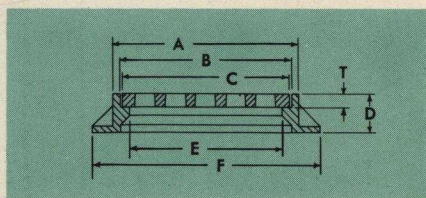
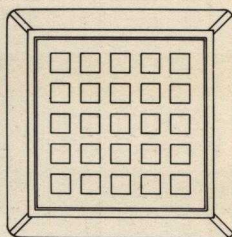
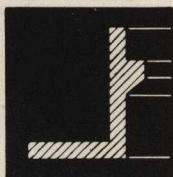
■ square



guarantee: ten years

ordering: see page 2

■ square



guarantee: ten years

ordering: see page 2

frame					grating				code no.
E	D	F	A	B	C	T	openings		
							no.	size	
ROADWAY      type 309-C      plane grating									
16	10	26	20	18	17¾	1½	12	1½ x 6¾	20200
18	6	26	20½	19½	19¾	1⅝	20	1 x 7½	19084
20	8	30	25	22	21¾	1½	..	...	19923
24	6	34	29¼	26¼	26	1½	36	2⅝ x 2⅝	19906
	8	34	29¼	26¼	26	1½	36	2⅝ x 2⅝	19907
	10	40¼	29¼	26¼	26	1½	36	2⅝ x 2⅝	28200
26	10	36½	31	28	27¾	1½	27	1⅝ x 6⅞	20202
30	6	40½	35	32	31¾	1½	..	...	19924
	8	40½	35	32	31¾	1½	..	...	19925
	10	40½	35	32	31¾	1½	..	...	28202
36	6	46½	41	38	37¾	1½	49	3¼ x 3¼	19910
	8	46½	41	38	37¾	1½	49	3¼ x 3¼	19911
	10	46½	41	38	37¾	1½	49	3¼ x 3¼	28204
42	6	52½	47	44	43¾	1½	..	...	19914
	8	52½	47	44	43¾	1½	..	...	19915
	10	52½	47	44	43¾	1½	..	...	28206
48	6	58½	53	50	49¾	1½	..	...	19918
	8	58½	53	50	49¾	1½	..	...	19919
	10	58½	53	50	49¾	1½	..	...	28208
54	6	64½	59	56	55¾	1½	..	...	19920
	8	64½	59	56	55¾	1½	..	...	19921
	10	64½	59	56	55¾	1½	..	...	28209

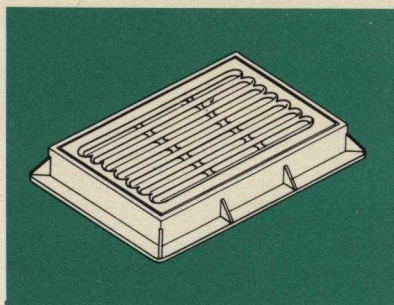
frame					grating				code no.	
E	D	F	A	B	C	T	openings			
							no.	size		area
ROADWAY      type 310-D      plane grating										
9½	5	21½	12¾	11½	11¼	3	9	2 x 2	36	19430
10	4	20	13½	12¾	12	1	36	1 x 1	36	25986
11½	4	20	15	13¾	13½	1	12	1½x 5½	77	25975
16	6¾	26	19½	18	17¾	1½	25	2 x 2	100	22580
	4	27	19¾	18¾	18	1¼	64	1 x 1	64	29180
18	8	32	21¾	20	19¾	2	64	1⅝ x 1⅝	121	21593
22	4	32¼	26¾	24¼	24	1¼	36	2⅝ x 2⅝	203	19334
	5	32¼	26¾	24¼	24	1¼	36	2⅝ x 2⅝	203	31392
	8	32¼	26¾	24¼	24	1¼	36	2⅝ x 2⅝	203	19333
	8¾	36	25¾	24¼	24	1¼	21	1¼ x 5⅝	216	27527
	8	40¼	26⅞	24¼	24	1¼	25	2⅝ x 2⅝	207	25414
24	6	33	27¾	26¼	26	1¼	36	2⅝ x 2⅝	163	33952
	8	35	27½	26	25¾	1½	36	2⅝ x 2⅝	163	30889
26½	7	37	30	29	28½	2	64	2 x 2	256	22585
30	6¾	41	33¾	32¼	32	2	27	2 x 8	432	39626
32	4	44	36	34¼	34	2½	49	3¼ x 3¼	518	25471
34	6	44	38	36	35¾	3	49	3¼ x 3¼	518	39629
36	8	48	40	38	37¾	1½	49	3¼ x 3¼	518	39634



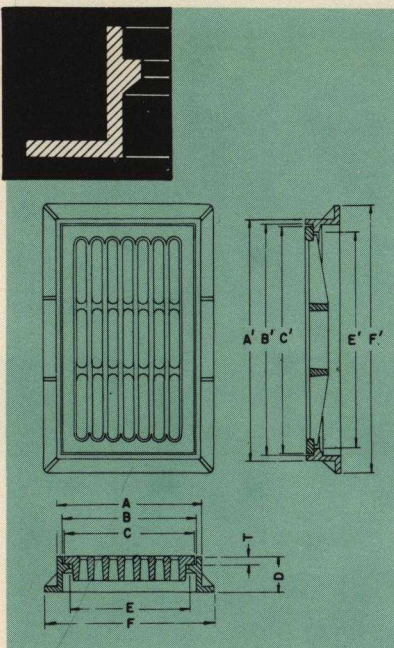
# INLET FRAMES

# GRATINGS

standard

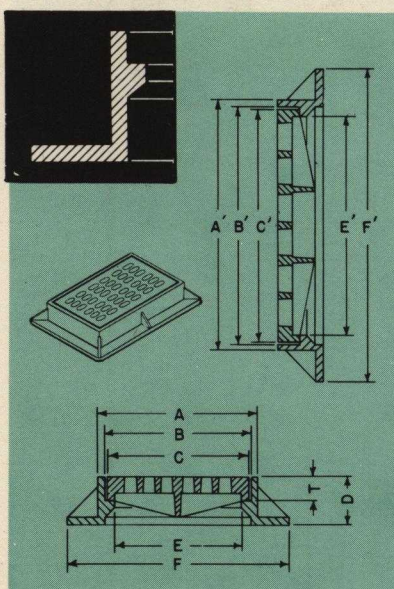


rectangular



guarantee: ten years  
ordering: see page 2

rectangular



frame									grating							code no.	
E	E'	D	F	F'	A	A'	B	B'	C	C'	T	openings					
												no.	size	area			
ROADWAY type 325-D																	
10 10	21 45¾	5 5	20 20	31 53¾	14 14	25 47¼	12 12	23 45¾	11¾ 11¾	22¼ 45½	1½ 1½	8 16	1½ x 9¾ 1½ x 9¾	100 200	39659 22547		
15¼ 15¼	45¼ 21¾	3½ 3¼	22¾ 22¾	28¼ 28¼	20¼ 20¼	50¼ 26¼	18¼ 18¼	48¼ 24¼	18 18	48 24	2¼ 2¼	24 12	1½ x 10½ 1½ x 10½	370 185	22548 32392		
17¼ 17¼	21 43¾	4 4	23¾ 23¾	30½ 53¼	20¾ 20¾	24½ 47¼	19¼ 19¼	23 45¾	19 19	22¼ 45½	1⅞ 1⅞	14 28	1½ x 9¾ 1½ x 9¾	190 380	34965 22409		
18½ 18½	32⅞ 66¼	4 4	28 28	41½ 75⅞	22¼ 22¼	36⅜ 70½	20¾ 20¾	34⅜ 68½	20½ 20½	34⅜ 68¼	1¼ 1¼	24 48	1½ x 9 1½ x 9	236 472	21362 22424		
19¼ 19¼	32¼ 66⅞	4 4	28 28	41⅜ 75¼	22¼ 22¼	35⅝ 69½	21 21	34⅜ 68	20¾ 20¾	33⅜ 67¾	1¼ 1¼	24 48	1½ x 9 1½ x 9	236 472	21627 22428		
19½ 19½	36 74	5 5	30½ 30½	46¼ 84¾	23⅝ 23⅝	39⅝ 77⅝	21⅝ 21⅝	38¼ 76¼	21⅝ 21⅝	38 76	2 2	21 42	1½ x 11¼ 1½ x 11¼	344 688	30205 22433		
19½ 19½	33½ 69¼	5 5	28 28	42 77¾	23½ 23½	37½ 73¼	22 22	36 71¾	21¾ 21¾	35¼ 71½	1¼ 1¼	21 42	1½ x 9 1½ x 9	273 546	32316 22549		
19½ 19½	45 92½	5 5	28 28	54 101½	23½ 23½	49½ 97	22 22	48 95½	21¾ 21¾	47½ 95	1¼ 1¼	28 56	1½ x 10 1½ x 10	406 812	32315 22550		
21¼ 22	21 26	5 5	31¾ 32	31 36	25¼ 26	25 30	23¾ 24	23 28	23½ 23¾	22¼ 27¾	1½ 1⅞	16 16	1½ x 9¾ 1½ x 11½	200 271	22438 22546		
22 22	53¼ 33	5 4	32 30	63¾ 41	26 25½	57¼ 36½	24 24	55¼ 35	23½ 23¾	55½ 34¾	1⅞ 1½	32 21	1½ x 11½ 1½ x 10	542 305	22467 39421		
22 22	67¾ 67¾	4 4	30 30	75¾ 25½	25½ 71¼	24 24	69¾ 69¾	23¾ 23¾	69½ 69½	1½ 1½	42 42	1½ x 10 1½ x 10	610 610	22468 22468			
24 24	36 73¾	3½ 3½	32 32	44 81¾	28 28	40 77¾	26 26	38 75¾	25¼ 25¼	37¾ 75½	2½ 2½	27 54	1½ x 10½ 1½ x 10½	412 824	36096 22495		
24 24	30 62	5 5	34 34	40 72¼	28 28	34 66¼	26¼ 26¼	32¼ 64½	26 26	32¼ 64	3 3	24 48	1½ x 8½ 1½ x 8½	294 588	33121 22551		
24 24	36 74	5 5	34 34	46 84¼	28 28	40 78¼	26¼ 26¼	38¼ 76¼	26 26	38 76	3 3	24 48	1½ x 10½ 1½ x 10½	366 732	33120 22552		
33¼ 36¼	21¼ 21	3¼ 4	40¾ 42¾	28¾ 30½	38¼ 39¾	26¼ 24½	36¼ 38¼	24¼ 23	36 38	24 22¼	2¼ 1⅞	24 28	1½ x 10½ 1½ x 9¾	370 380	22496 22469		
39 40	32½ 32¼	4 4	48½ 48¼	41½ 41¾	43¼ 43¼	36⅜ 35⅝	41¼ 41¾	34⅜ 34⅜	41 41½	34⅜ 33⅝	1¼ 1¼	48 48	1½ x 9 1½ x 9	472 472	22525 22528		
41 41⅞	36 33½	5 5	52½ 49¾	46¾ 42	45 45½	39¾ 37½	43¾ 43¾	38¼ 36	43¼ 43½	38 35¼	2 1¼	42 42	1½ x 11¼ 1½ x 9	688 546	22697 23081		
41½ 41½	45 45	5 5	50 50	54 45½	49½ 49½	44 44	48 48	43½ 43½	47½ 47½	1¼ 1¼	56 56	1½ x 10 1½ x 10	812 812	22553 22553			
45¼ 45¼	26 33	5 4	55¾ 53¾	36 41	49¾ 49¼	30 36½	24 47¾	28 35	47¼ 47¼	27¼ 34¾	1⅞ 1½	32 42	1½ x 11½ 1½ x 10	542 610	23082 23086		
49¾ 49¾	36 36	3½ 3½	57¾ 57¾	44 44	53¾ 53¾	40 40	51¾ 51¾	38 38	51½ 51½	37¾ 37¾	2½ 2½	54 54	1½ x 10½ 1½ x 10½	824 824	23091 23091		
50 50	30 36	5 5	60 60	40 46	54 54	34 40	52¼ 52¼	32¼ 38¼	52 52	32 38	3 3	48 48	1½ x 8½ 1½ x 10	588 732	22554 22555		

frame									grating							openings			code no.
E	E'	D	F	F'	A	A'	B	B'	C	C'	T	no.	size	area					
ROADWAY type 326-D																			
12	36 74	6 6	20 20	44 82	15½ 15½	39½ 77¼	14 14	38 76	13¾ 13¾	37¾ 75¾	2 2	28 56	...	...	...	38459 22533			
16	28 58	6 6	28 28	40 71	19⅞ 19⅞	31⅞ 62	18⅞ 18⅞	30⅞ 60½	18⅞ 18⅞	30⅞ 60¼	3 3	36 72	1½ x 3⅞ 1½ x 3⅞	185 370	32381 22534				
19	22¾	8	26½	31	21¾	25¾	20¼	24¼	20	24	1¼	30	1⅝ x 3	129	29404				
	32	4	28	41⅝	22½	35⅝	21	34⅝	20¾	33⅝	1	35	2 x 3¼	197	32308				
	45	5	28	54	23½	49½	22	48	21¾	47¾	1¼	60	...	...	22542				
	45	5	28	54	23½	49½	22	48	21¾	47¾	3	60	...	...	22541				
	66	4	28	75	22½	69½	21	68	20¾	67¾	1	70	2 x 3¼	394	22536				
93	5	28	102	23½	97½	22	96	21¾	95½	3	120	...	...	...	22535				
24	36	3½	32	44	28	40	26	38	25¾	37¾	2½	72	1⅝ x 3½	366	31680				
	74	3½	32	82	28	78	26	76	25¾	75½	2½	144	1⅝ x 3½	732	22537				
26	46	6	34	54	29½	49½	28	48	27¾	47¾	1½	80	2 x 3⅞	471	22543				
	94	6	34	102	29½	97½	28	96	27¾	95½	1½	160	2 x 3⅞	942	22538				
27	46	6	36	55	30½	49½	29	48	28¾	47¾	1¼	90	1⅝ x 3½	520	29400				
	94	6	36	103	29½	97½	29	96	28¾	95½	1¼	180	1⅝ x 3½	1040	22539				
36	56	3½	44	58	40	54	38	52	37¾	51½	2½	144	1⅝ x 3½	732	22544				
44	45	5	53	54	48½	49½	47	48	43½	47¾	1¼	120	...	...	22540				
46	56	6	56½	66½	49½	59½	48	58	47¾	57½	1¼	180	1⅝ x 3½	1040	22545				

GUARANTEED CONSTRUCTION CASTINGS



# BRIDGE AND DECK SCUPPERS

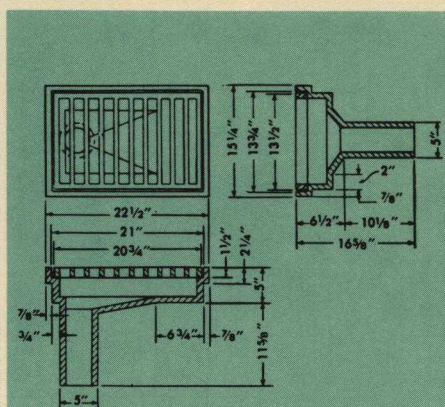
These scuppers are typical, but many other types and sizes are available to suit your needs. Contact Flockhart Engineering Department.

**variations:** 1, 3, 4, 16, 19 (page 2)

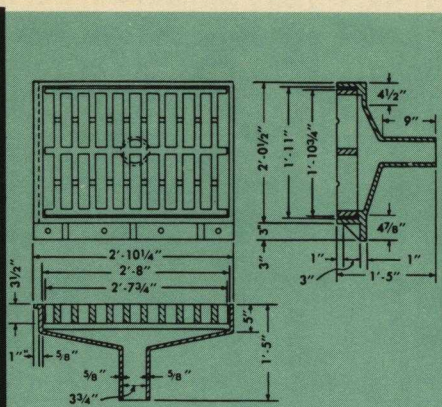
**ordering:** see page 2

depth and diameter of outlet can be varied

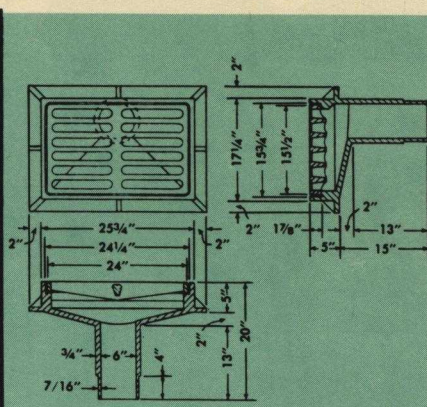
ductile iron or cast steel gratings available on specification



code no. 19168



code no. 34349



code no. 19833

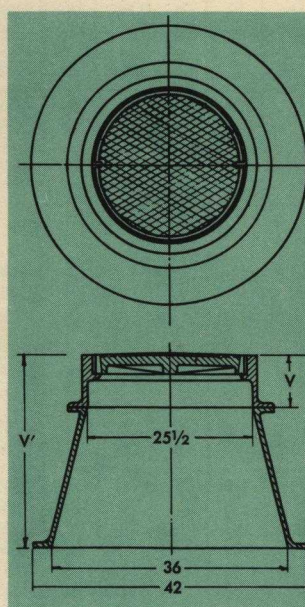
## VALVE BOX FRAMES COVERS

● **circular** for pit construction **ROADWAY**

**variations:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 15, 18, 19 (page 2)

**guarantee:** 10 years

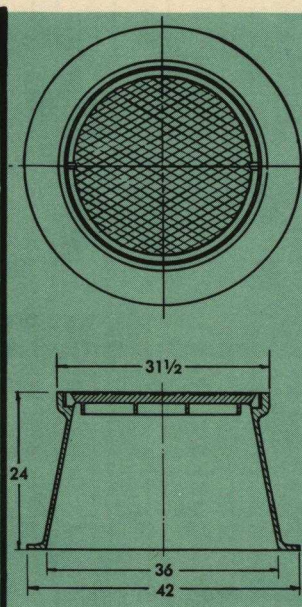
**ordering:** see page 2



V | V' | code no.

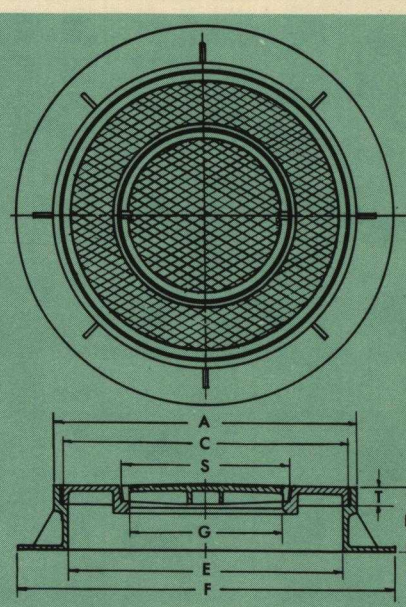
**type 660-A**  
skirt, frame, cover

6	30	61820
8	32	61821
9 1/2	33 1/2	61822
12	36	61823



**type 660-B**  
skirt, cover

code no. 28610

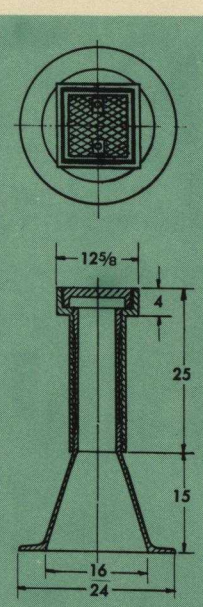


E | A | G | D | F | C | T | S | code no.

**type 660-C**  
frame, concentric covers

30	34 1/2	22	8	42	32	1 1/2	22	61828
36	41 1/2	21 3/8	8	48 1/2	37 3/4	1 3/8	23 3/4	61825
42	46 3/4	24	10	58	44 1/2	3	26	61826
48	53	22	8	60	49 5/8	1 1/2	24	61829
54	60	22	8	64	57 3/4	1 1/2	24	61830
60	66	22	8	70	66 3/4	1 1/2	24	61831

inner cover cast aluminum on request



**type 660-D**  
frame, sleeve, cover

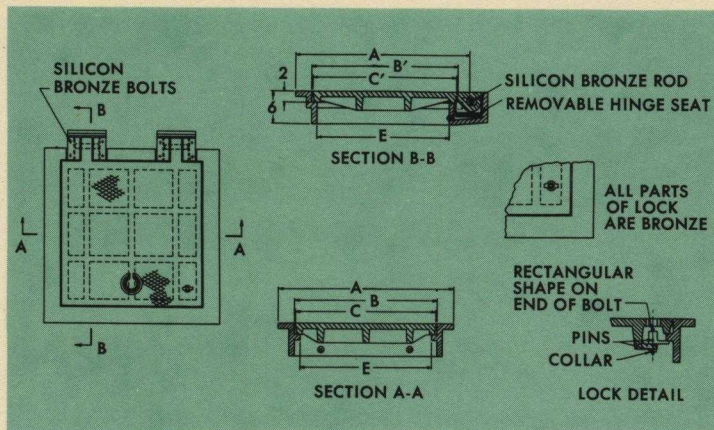
code no. 25284



# MANHOLE FRAMES HINGED COVERS

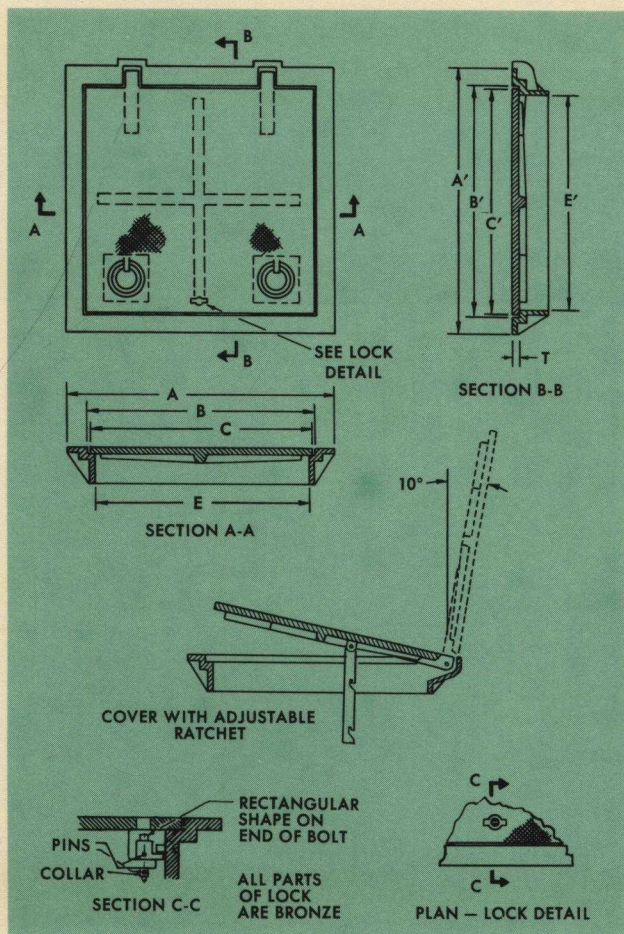
■ square • for slab construction

variations: 7, 8, 9, 11, 12, 15, 18, 19 (page 2)  
guarantee: ROADWAY types for 10 years  
ordering: see page 2



frame				cover		code no.	
E	A	B	B'	C	C'	without lock	with lock
<b>ROADWAY type 644</b>							
8	16	10	10 1/4	9 3/4	10 1/4	19170	19171
12	20	14	14 1/4	13 3/4	14 1/4	19172	19173
18	26	20	20 1/4	19 3/4	20 1/4	19174	19175
20	28	22	22 1/4	21 3/4	22 1/4	19176	19177
24	32	26	26 1/4	25 3/4	26 1/4	19178	19179
27	35	29	29 1/4	28 3/4	29 1/4	19180	19181
30	38	32	32 1/4	31 3/4	32 1/4	19182	19183
33	41	35	35 1/4	34 3/4	35 1/4	19184	19185
36	44	38	38 1/4	37 3/4	38 1/4	19186	19187
39	47	41	41 1/4	40 3/4	41 1/4	19188	19189
42	50	44	44 1/4	43 3/4	44 1/4	19190	19191

■ square or ■ rectangular • for slab construction



frame									code no.	
E	E'	A	A'	B	B'	C	C'	T	without lock	with lock
<b>WALKWAY type 678</b>										
6	7	12	13	8	9	7 1/2	8 1/2	5/8	15737	
12	12	18	18	14	14	13 1/2	13 1/2	5/8	16200	16201
12	18	18	24	14	20	13 1/2	19 1/2	5/8	16202	16203
12	24	18	30	14	26	13 1/2	25 1/2	5/8	16204	16205
15	15	24	24	17	17	16 1/2	16 1/2	5/8	29810	29811
18	18	24	24	20	20	19 1/2	19 1/2	3/4	16206	16207
18	27	24	33	20	29	19 1/2	28 1/2	3/4	16208	16209
18	36	24	42	20	38	19 1/2	37 1/2	3/4	16210	16211
24	42	30	48	26	44	25 1/2	43 1/2	3/4	26577	
24	24	30	30	26	26	25 1/2	25 1/2	3/4	16212	16213
24	30	30	36	26	32	25 1/2	31 1/2	3/4	15335	
24	36	30	42	26	38	25 1/2	37 1/2	3/4	16214	16215
24	48	30	54	26	50	25 1/2	49 1/2	3/4	16216	16217
30	30	36	36	32	32	31 1/2	31 1/2	3/4	16218	16219
30	45	36	51	32	47	31 1/2	46 1/2	3/4	16220	16221
30	60	36	66	32	62	31 1/2	61 1/2	3/4	16222	16223
36	36	42	42	38	38	37 1/2	37 1/2	3/4	16224	16225
36	54	42	60	38	56	37 1/2	55 1/2	3/4	16226	16227
36	72	42	78	38	74	37 1/2	73 1/2	3/4	16228	16229
42	42	48	48	44	44	43 1/2	43 1/2	3/4	15180	15181
42	63	48	69	44	65	43 1/2	64 1/2	3/4	15182	15183
42	84	48	90	44	86	43 1/2	85 1/2	3/4	15184	15185
48	48	54	54	50	50	49 1/2	49 1/2	3/4	15186	15187
48	72	54	78	50	74	49 1/2	73 1/2	3/4	15188	15189
48	96	54	102	50	98	49 1/2	97 1/2	3/4	15190	15191

- depth of frame 4 in. unless otherwise specified
- rectangular units larger than 24 in. x 36 in. with cover in two equal parts
- key cannot be removed unless cover is locked
- cast aluminum covers as specified
- ratchet only if specified



# TROUGHS

with cover or grating

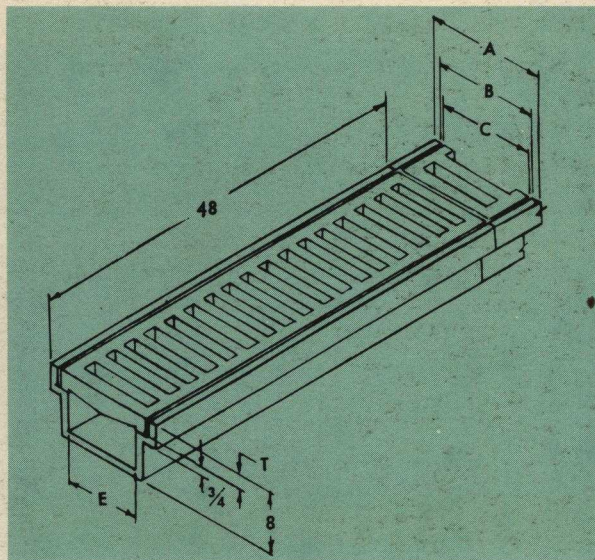
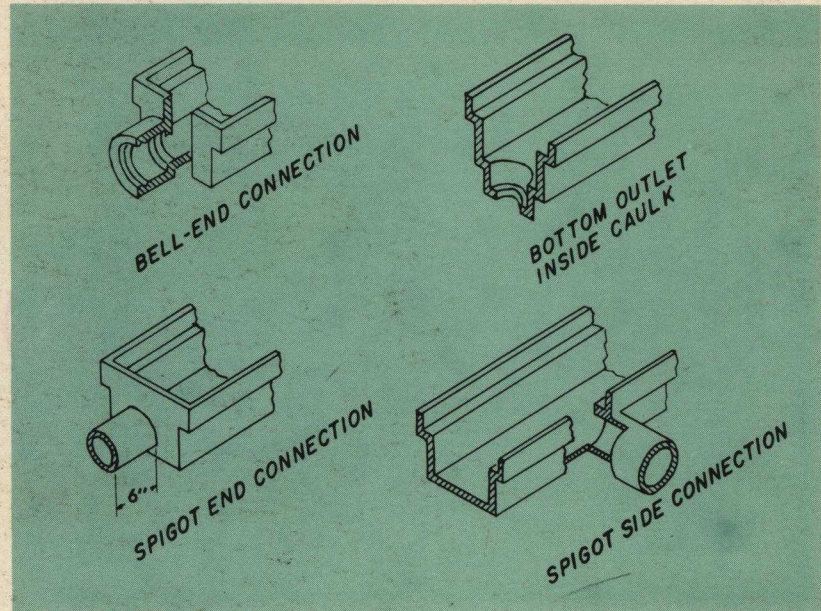
FLOCKHART troughs, with grating (or cover), are particularly suited to public buildings, garages, laundries, manufacturing plants, parking areas—also to shower rooms in schools, dormitories, stadia and factories. They eliminate the necessity and expense of forms for building trenches. They assure uniform bearing of the grating (or cover) on the trough.

The sections, 48 in. long, are regularly furnished with open ends, butt joints and without pipe connections. However, these troughs can be furnished, when specified, with outlet pipe connections for extra heavy cast iron soil pipe.

For unusual requirements, these FLOCKHART troughs can be furnished with special features:

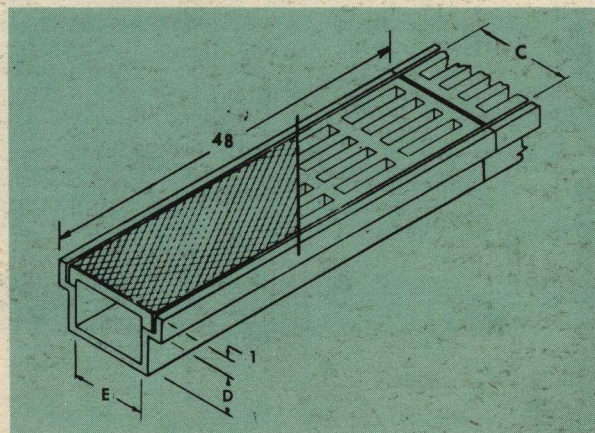
- special caulked joints between adjoining sections—for installations that must be watertight
- grating (or cover) secured to frame by silicon bronze bolts
- grating (or cover) of aluminum or bronze

**ordering:** give type number and code number (from table); also state over-all length of assembly and any special requirements; sections with closed ends; outlet connections by size, type (spigot, bell, inside caulk)



also available with cover for roadway use  
**ordering:** see page 2

E	A	B	C	T	cast fitting surfaces type A	milled horizontal fitting surfaces type B	milled horizontal & vertical fitting surfaces type C
<b>ROADWAY type 646 with grating</b>							
6	10½	8½	8¼	2	17300	17301	17302
8	12½	10½	10¼	2	17303	17304	17305
10	14½	12½	12¼	2	17306	17307	17308
12	16½	14½	14¼	2	17309	17310	17311
14	18½	16½	16¼	2½	17312	17313	17314
16	20½	18½	18¼	2½	17315	17316	17317
18	22½	20½	20¼	2½	17318	17319	17320
20	24½	22½	22¼	2½	16153	16154	16155
24	28½	26½	26¼	3	16159	16160	16161



can be made watertight either by lead caulking or by bolting and gasketing  
**ordering:** see page 2

		D = 4"		D = 6"	
E	C	cover	grating	cover	grating
WALKWAY® type 689 with cover or grating					
4	5¼	17900	17901	17902	17903
6	7¼	17904	17905	17906	17907
8	9¼	17908	17909	17910	17911
10	11¼	17912	17913	17914	17915
12	13¼	17916	17917	17918	17919



# TRENCH FRAMES

with cover or grating

covers and gratings for trench openings, W, wider than 12 in. made 24 in. long

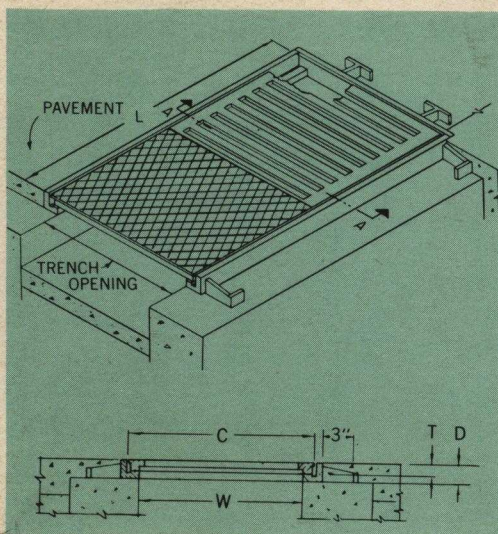
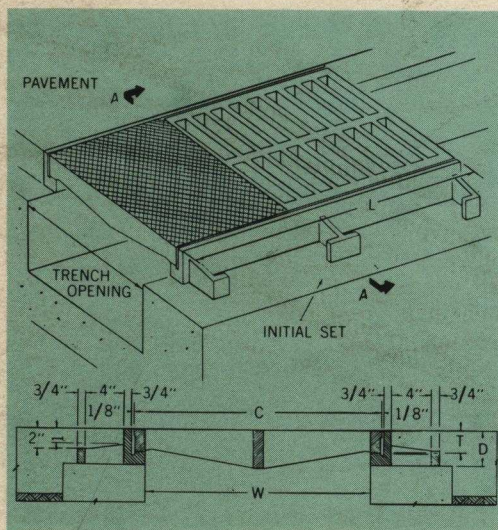
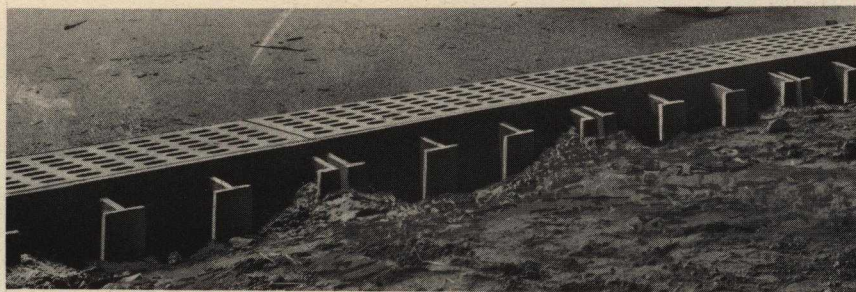
**variations:** made of cast aluminum or bronze on order; frames bolted together with steel bolts when specified

**guarantee:** ROADWAY types for ten years

**installation:**

- set each frame and grating as a unit
- adjust unit to proper plane and cement anchors to base for initial set
- after cement hardens, test unit for plane
- pour concrete

**ordering:** see page 2



					cast fitting surfaces type A		milled horizontal fitting surfaces type B		milled horizontal & vertical fitting surfaces type C	
W	L	C	T	D	672	679	672	679	672	679
ROADWAY    type 672 with cover    •    type 679 with grating										
6	48	8¼	2	3	45400	41100	45401	41101	45402	41102
8	48	10¼	2	3	45403	41103	45404	41104	45405	41105
10	48	12¼	2	3	45406	41106	45407	41107	45408	41108
12	48	14¼	2	3	45409	41109	45410	41110	45411	41111
14	48	16¼	2½	3½	45412	41112	45413	41113	45414	41114
16	48	18¼	2½	3½	45415	41115	45416	41116	45417	41117
18	48	20¼	2½	3½	45418	41118	45419	41119	45420	41120
20	48	22¼	2½	3½	45421	41121	45422	41122	45423	41123
22	48	24¼	2½	3½	45424	41124	45425	41125	45426	41126
24	48	26¼	3	4	45427	41127	45428	41128	45429	41129
30	48	32¼	3	4	45430	41130	45431	41131	45432	41132
36	48	38¼	3	4	45433	41133	45434	41134	45435	41135
42	48	44¼	3	4	45436	41136	45437	41137	45438	41138
48	48	50¼	3	4	45439	41139	45440	41140	45441	41141
54	48	56¼	4	5	45442	41142	45443	41143	45444	41144
60	48	62¼	4	5	45445	41145	45446	41146	45447	41147

					type A		type B		type C	
					cast fitting surfaces		milled horizontal fitting surfaces		milled horizontal & vertical surfaces	
W	L	C	T	D	1252	1253	1252	1253	1252	1253
WALKWAY type 1252 with cover • type 1253 with grating										
6	24	8	1¼	2	41000	41400	41001	41401	41002	41402
8	24	10	1¼	2	41003	41403	41004	41404	41005	41405
10	24	12	1¼	2	41006	41406	41007	41407	41008	41408
12	24	14	1¼	2	41009	41409	41010	41410	41011	41411
14	24	16	1¼	2	41012	41412	41013	41413	41014	41414
16	24	18	1¼	2	41015	41415	41016	41416	41017	41417
18	24	20	1¼	2	41018	41418	41019	41419	41020	41420
20	24	22	1½	2¼	41021	41421	41022	41422	41023	41423
24	24	26	1½	2¼	41024	41424	41025	41425	41026	41426
27	24	29	1½	2¼	41027	41427	41028	41428	41029	41429
30	24	32	1¾	2½	41030	41430	41031	41431	41032	41432
33	24	35	1¾	2½	41033	41433	41034	41434	41035	41435
36	24	38	1¾	2½	41036	41436	41037	41437	41038	41438
39	24	41	1¾	2½	41039	41439	41040	41440	41041	41441
42	24	44	2	2¾	41042	41442	41043	41443	41044	41444
45	24	47	2	2¾	41045	41445	41046	41446	41047	41447
48	24	50	2	2¾	41048	41448	41049	41449	41050	41450
54	24	56	2	2¾	41051	41451	41052	41452	41053	41453
60	24	62	2	2¾	41054	41454	41055	41455	41056	41456



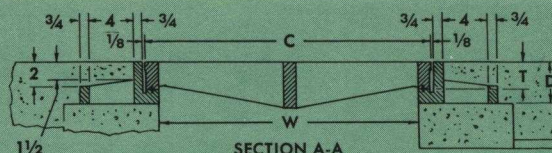
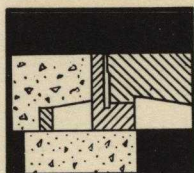
# FRAMES GRATINGS FOR AIRPORT USE

These Flockhart castings are specially designed and formulated to handle the heavy wheel loads of military, continental and intercontinental aircraft. They are used alongside runways, on aprons and in hangars.

Their design loading conforms with the most recent CAA recommendations, used extensively by municipal and state agencies for their airports.



trench frame with grating • for pit construction extra heavy duty



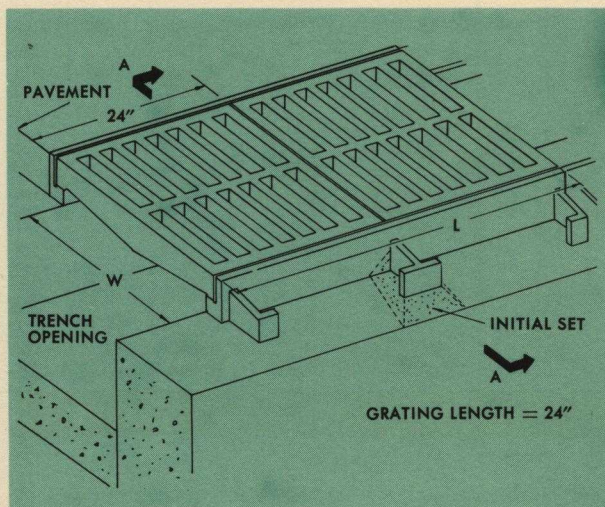
Frame made of cast iron; grating made of either cast iron or ductile iron depending on load and span. Load ratings shown in table are for uniformly distributed loads and cover the majority of existing wheel loads. However, when trench width is 36 inches or more, it is necessary, in specifying or ordering, to specify actual wheel load, also the contact area or type of plane. Seats of frame and grating milled for perfect bearing.

Variations, when specified, are available: frame sections bolted together with steel bolts; grating bolted to frame (stainless steel or bronze, as specified).

#### installation:

- set each frame and grating as a unit
- adjust unit to proper plane and cement anchors to base for initial set
- after cement hardens, test unit for plane
- pour concrete

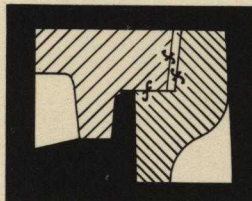
for roadway trench frames and cover or grating see page 23.



					loading in lb per sq in.			
W	L	C	T	D	110	143	200	243
<b>type 688</b>								
6	48	8 3/4	2	3	47100	47101	47102	47103
8	48	10 3/4	2	3	47104	47105	47106	47107
10	48	12 3/4	2	3	47108	47109	47110	47111
12	48	14 3/4	2	3	47112	47113	47114	47115
14	48	16 3/4	2 1/2	3 1/2	47116	47117	47118	47119
16	48	18 3/4	2 1/2	3 1/2	47120	47121	47122	47123
18	48	20 3/4	2 1/2	3 1/2	47124	47125	47126	47127
20	48	22 3/4	2 1/2	3 1/2	47128	47129	47130	47131
22	48	24 3/4	2 1/2	3 1/2	47132	47133	47134	47135
24	48	26 3/4	3	4	47136	47137	47138	47139
30	48	32 3/4	3	4	47140	47141	47142	47143
36	48	38 3/4	3	4	47144	47145	47146	47147
42	48	44 3/4	3	4	47148	47149	47150	47151
48	48	50 3/4	3	4	47152	47153	47154	47155
54	48	56 3/4	4	5	47156	47157	47158	47159
60	48	60 3/4	4	5	47160	47161	47162	47163



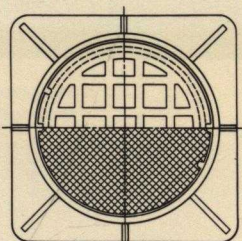
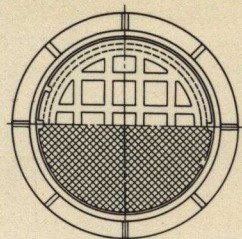
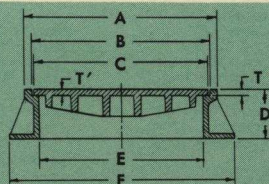
# FRAMES GRATINGS FOR AIRPORT USE



horizontal and vertical fitting surfaces of frame and cover shall be milled to a true and even surface

\*indicates cast iron cover or grating

T<sup>1</sup> depends on loading

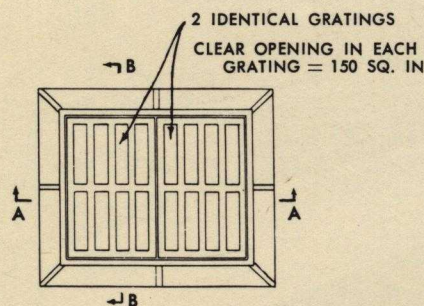
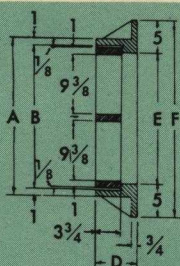
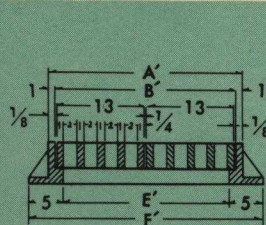
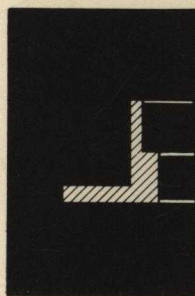


							circular flange			square flange		
frame							loading—lbs. per sq. inch			loading—lbs. per sq. inch		
E	D	F	A	B	C	T	110	143	243	110	143	243
<b>type 1126-C with cast steel cover</b>												
24	8	34	28½	26	25¾	1⅝	*21300	*21301	21302	*21303	*21304	21305
27	8	37	31½	29	28¾	1⅝	*21306	*21307	21308	*21309	*21310	21311
30	8	40	34½	32	31¾	1⅝	*21312	21313	21314	*21315	21316	21317
32	8	42	36½	34¼	34	1½	21318	21319	21320	21321	21322	21323
36	8	46	41	38¾	38	1½	21324	21325	21326	21327	21328	21329
42	8	52	46¾	44¼	44	2	21330	21331	21332	21333	21334	21335
48	8	58	53	50¼	50	2½	21336	21337	21338	21339	21340	21341

<b>type 667-C with cast steel grating</b>												
							grate					
E	D	F	A	B	C	T	110	143	243	110	143	243
24	8	34	28½	26	25¾	1⅝	*19200	*19201	19202	*19203	*19204	19205
27	8	37	31½	29	28¾	1⅝	*19206	*19207	19208	*19209	*19210	19211
30	8	40	34½	32	31¾	1⅝	*19212	19213	19214	*19215	19216	19217
32	8	42	36½	34¼	34	1½	19218	19219	19220	19221	19222	19223
36	8	46	41	38¾	38	1½	19224	19225	19226	19227	19228	19229
42	8	52	46¾	44¼	44	2	19230	19231	19232	19233	19234	19235
48	8	58	53	50¼	50	2½	19236	19237	19238	19239	19240	19241

## inlet frame with grating extra heavy duty

**rectangular** • for pit construction



E x E'	D	F x F'	A x A'	B x B'	no. of gratings	free area	code no.
<b>type 687</b>							
20 x 24½	6	30 x 34½	24 x 28½	22 x 26½	2	60%	34343
20 x 37½	6	30 x 47½	24 x 41½	22 x 39½	3	60%	34344
20 x 50½	6	30 x 60½	24 x 54½	22 x 53½	4	60%	34345

Frame made of cast iron ASTM A-48, class 30; grating made of ductile iron ASTM A-339—for 65,000 lb wheel load or 230 psi uniformly distributed load.

Frame designed with substantial flange for proper distribution of pressure to supporting structure. Grating designed with deep seating to prevent movement under wheel load; made in multiple sections to facilitate cleaning of catch basin.



ARMORED CONCRETE is concrete with the exposed vertical surfaces armored with grey cast iron. This armor is bonded to the concrete in such a manner that no part of it can vibrate in the slightest degree. Consequently there can be no fracture of the iron. Since cast iron is substantially incompressible, the force of an impact is so widely distributed that the concrete is undamaged. The resistance of the cast iron element to abrasion and corrosion is evident. The coefficients of expansion of cast iron and concrete are for all practical purposes identical; thus ARMORED CONCRETE is unaffected by variations of temperature.

### advantages

- impact resistance: the only commercially known building material that resists impact perfectly
- abrasion resistance: all surfaces subject to abrasion are protected by the cast iron component
- corrosion resistance: the corrosion of cast iron is negligible
- temperature variation: no effect

### testing

In 1924, initial installations of ARMORED CONCRETE were made at selected points in metropolitan New York. Locations were purposely selected which would subject the construction to the most severe impact and abrasion conditions. Not one failure has occurred. Since 1924, hundreds of ARMORED CONCRETE installations have been made in all parts of the country—many where other types of construction had failed. *In all instances, ARMORED CONCRETE has withstood the double test of time and performance.*

### representative installations

**United States Government**  
U. S. Military Academy, West Point

**Port of New York Authority**  
Idlewild International Airport  
Tri-Borough Bridge safety islands  
Island Terminal No. 1  
Holland Tunnel approaches  
Lincoln Tunnel approaches

**New York City Tunnel Authority**  
Queens Midtown Tunnel approaches

**New York Central System**  
Grand Central Terminal

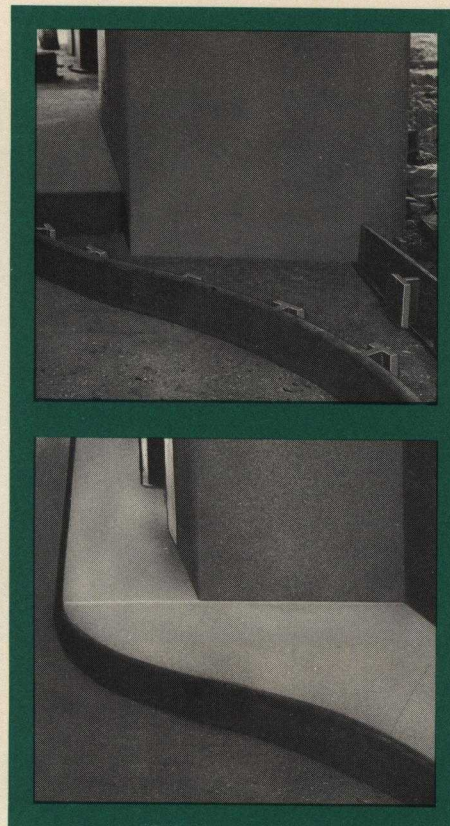
**United Nations**  
Headquarters, New York City

**New York City**  
Henry Hudson Parkway toll booth islands

**Pennsylvania Railroad**  
Newark station

### guarantee

Providing the method of installation is directed by us, any cast iron component which may crack within ten years from invoice date will be replaced gratis, fob nearest railroad station. In addition, a cash refund equal to the purchase price of the cast iron component will be made.

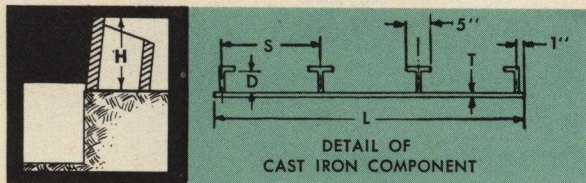




# ARMORED CONCRETE

for sidewalk curb, loading platforms

## for sidewalk curb

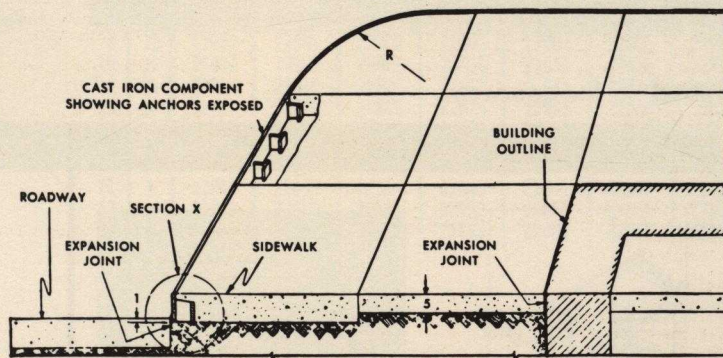


Batter, unless otherwise specified, 2°. Except for radial sections, any batter can be obtained by proper setting of casting. For radial sections, specify batter required.

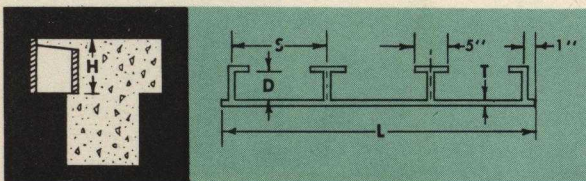
### dimensions

H as required  
L 6½ ft max  
T ¾ to 1 in.  
D 4 in.  
S 18 in. max  
R as required

### type 700



## for loading platforms

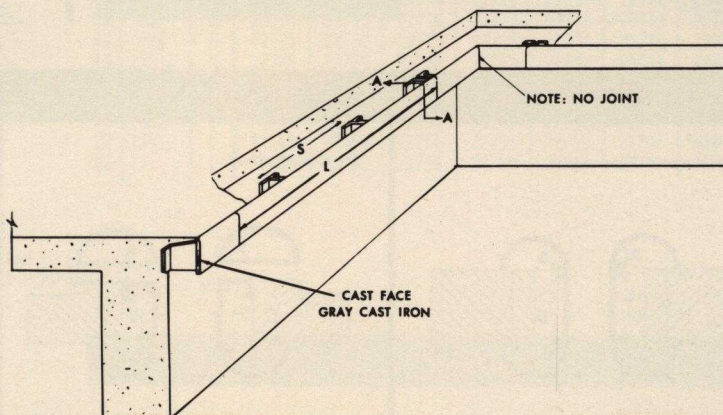


guarantee: 10 years

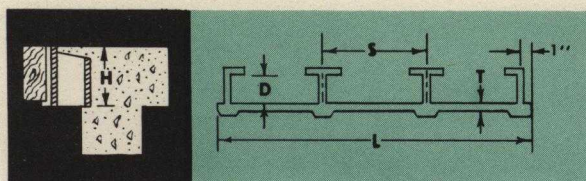
### dimensions

H 6, 8, 10, 12 in. or as specified  
T ¾ to 1 in.  
S 20 in.  
D 6 in. min  
L 48 in. or as required

### type 754 without provision for wood bumper



## for loading platforms



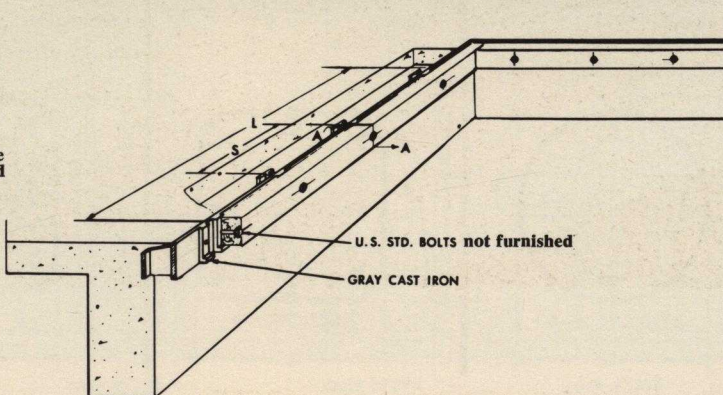
This type has the necessary tapped holes for attaching a renewable wooden bumper to prevent damage to vehicles. (Wood bumper and bolts not furnished).

guarantee: 10 years

### dimensions

H 6, 8, 10, 12 in. or as specified  
T ¾ to 1 in.  
S 20 in. max  
D 6 in. min  
L 48 in. or as required  
holes tapped ½ inch A.S.T.

### type 755 with provision for wood bumper





# WHEEL GUARDS

armored concrete

FLOCKHART wheel guards of the armored concrete type are concrete with the exposed vertical surfaces armored with grey cast iron. This armor is bonded to the concrete in such a manner that no part of it can vibrate in the slightest degree. Consequently there can be no fracture of the iron. Since cast iron is substantially incompressible, the force of an impact is so widely distributed that the concrete is undamaged. The resistance of the cast iron element to abrasion and corrosion is evident. The coefficients of expansion of cast iron and concrete are for all practical purposes identical: thus, wheel guards of the armored concrete type are unaffected by variations of temperature.

## guarantee

Providing the method of installation is directed by us, any cast iron component which may crack within ten years from invoice date will be replaced gratis, for nearest railroad station. In addition, a cash refund equal to the purchase price of the cast iron component will be made.

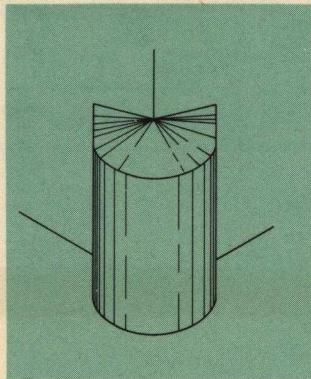
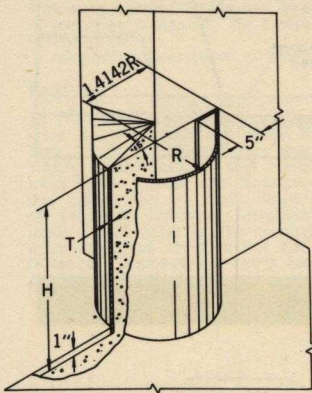
## dimensions

H, R, L, X, Y, Z: as specified

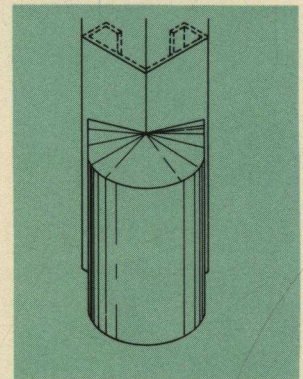
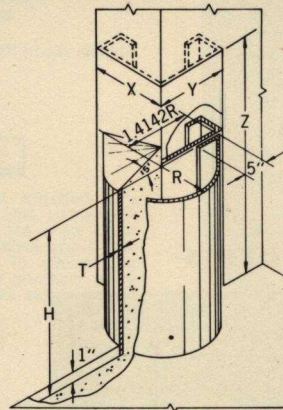
D 4 in.  
T  $\frac{7}{8}$  to 1 in.  
C 7 in. min  
V variable

## round • for doorways

type 706-C without column protection

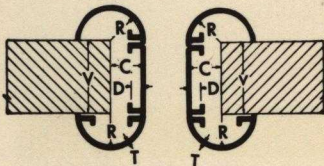


type 706-D with column protection



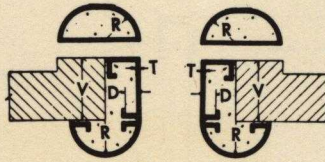
type 707-A

oval  
for open doorway



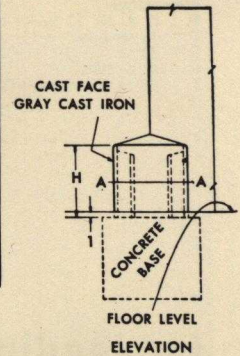
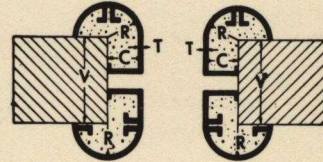
type 707-B

for sliding door



type 707-C

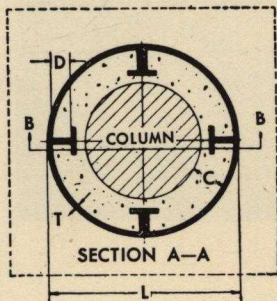
for overhead door



## for columns

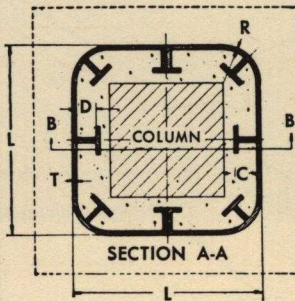
type 710-A

round



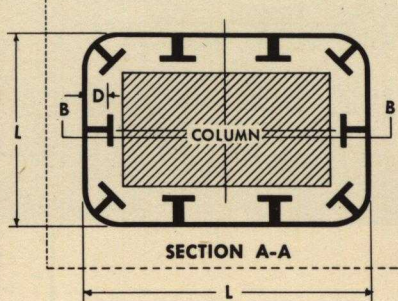
type 710-B

square

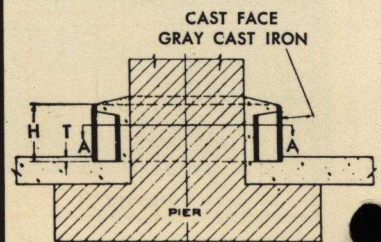


type 710-C

rectangular



section AA for  
ARMORED CONCRETE  
wheel guards for columns  
shown at left

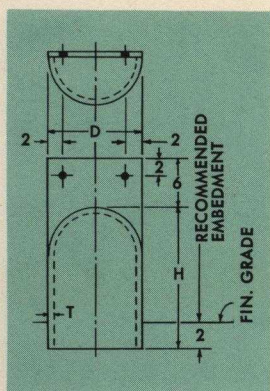




# WHEEL GUARDS

**bolted**

**180°**



- made of finest quality close-grained grey iron
- bolt holes:  $\frac{7}{8}$  in. diam, cored
- grout hole: only when specified

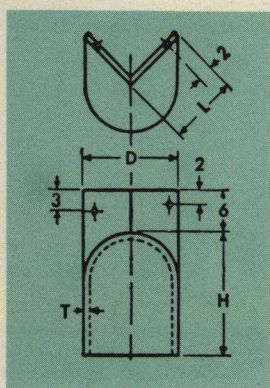
**guarantee:** for 10 years  
for other sizes, write for information

D | T | H-12 | H-18 | H-24 | H-30 | H-36 | H-42 | H-48

## type 649

8	$\frac{3}{8}$	22800	22801	22802	22803	22804	22805	22806
10	$\frac{7}{8}$	22807	22808	22809	22810	22811	22812	22813
12	$\frac{7}{8}$	22814	22815	22816	22817	22818	22819	22820
14	$\frac{7}{8}$	22821	22822	22823	22824	22825	22826	22827
16	$\frac{7}{8}$	22828	22829	22830	22831	22832	22833	22834
18	1	22835	22836	22837	22838	22839	22840	22841
20	1	22842	22843	22844	22845	22846	22847	22848
22	1	22849	22850	22851	22852	22853	22854	22855
24	1	22856	22857	22858	22859	22860	22861	22862

**90°**



- made of finest quality close-grained grey iron
- bolt holes:  $\frac{7}{8}$  in. diam, cored
- grout hole: only when specified

**guarantee:** for 10 years  
for other sizes, write for information

D | L | T | H-12 | H-18 | H-24 | H-30 | H-36 | H-42 | H-48

## type 647

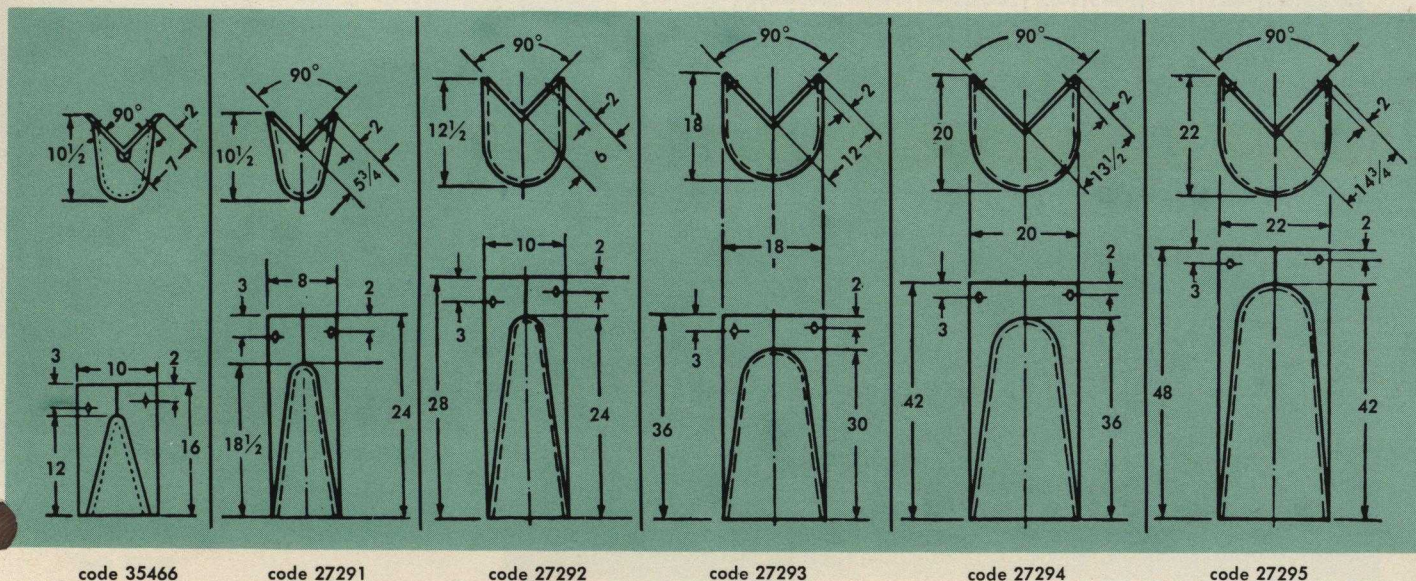
8	$5\frac{5}{8}$	$\frac{3}{8}$	22700	22701	22702	22703	22704	22705	22706
10	$7\frac{1}{16}$	$\frac{3}{8}$	22707	22708	22709	22710	22711	22712	22713
12	$8\frac{1}{2}$	$\frac{3}{8}$	22714	22715	22716	22717	22718	22719	22720
14	$9\frac{1}{8}$	$\frac{3}{8}$	22721	22722	22723	22724	22725	22726	22727
16	$11\frac{5}{16}$	$\frac{3}{8}$	22728	22729	22730	22731	22732	22733	22734
18	$12\frac{1}{16}$	1	22735	22736	22737	22738	22739	22740	22741
20	$14\frac{1}{8}$	1	22742	22743	22744	22745	22746	22747	22748
22	$15\frac{9}{16}$	1	22749	22750	22751	22752	22753	22754	22755
24	17	1	22756	22757	22758	22759	22760	22761	22762

**90°**

- made of finest quality close-grained grey iron
- thickness:  $\frac{3}{8}$  to 1 in.
- bolt holes:  $\frac{7}{8}$  in. diam, cored
- grout hole: only when specified

**guarantee:** for 10 years  
**ordering:** by code number

## type 648



**GUARANTEED CONSTRUCTION CASTINGS**



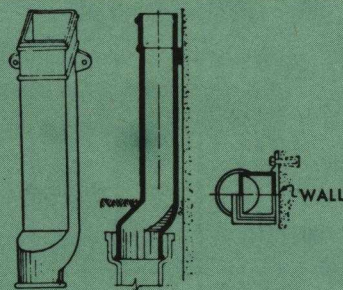
# RELATED PRODUCTS

## leader shoes

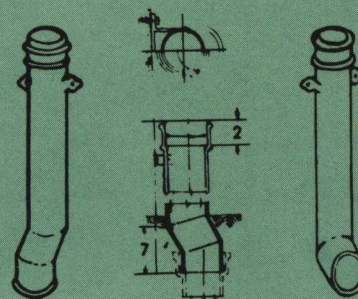
### square, rectangular

lengths 24-in. and longer furnished with one lug fastened to shoe 4 in. below top by 1/4 csk machine screw; type 209, 212 offset, on specification, for base

ordering: see page 2



### circular



length in.	dimensions, in.															
	2 x 2	2 x 3	2 x 4	3 x 3	3 x 4	3 x 5	4 x 4	4 x 5	4 x 6	4 x 8	5 x 5	5 x 8	6 x 6	6 x 8		

#### type 209 for soil pipe connection

12	34000	34008	39800	34016	34025	22240	34033	34041	37700	37710	34850	37720	37730	39500		
18	34001	34009	39801	34017	34026	22241	34034	34042	37701	37711	34851	37721	37731	39501		
24	34002	34010	39802	34018	34027	22242	34035	34043	37702	37712	34852	37722	37732	39502		
30	34003	34011	39803	34019	34028	22243	34036	34044	37703	37713	34853	37723	37733	39503		
36	34004	34012	39804	34021	34029	22244	34037	34045	37704	37714	34854	37724	37734	39504		
42	34005	34013	39805	34022	34030	22245	34038	34046	37705	37715	34855	37725	37735	39505		
48	34006	34014	39806	34023	34031	22246	34039	34047	37706	37716	34856	37726	37736	39506		
54	34007	34015	39807	34024	34032	22247	34040	34048	37707	37717	34857	37727	37737	39507		
60	34500	34502	39808	34504	34506	22248	34508	34510	37708	37718	34858	37728	37738	39508		
66	22380	22381	39809	22382	22383	22249	22384	22385	22386	22387	34859	22388	22389	22390		
72	34501	34503	39810	34505	34507	22250	34509	34511	37709	37719	34860	37729	37739	39509		
84	39400	39401	39811	34402	39403	22251	39404	39405	39406	39407	34861	39408	39409	39510		

#### type 210 for surface drainage

12	14800	14812	14824	14836	14848	14860	14872	14884	14896	14908	14920	14932	14944	14956		
18	14801	14813	14825	14837	14849	14861	14873	14885	14897	14909	14921	14933	14945	14957		
24	14802	14814	14826	14838	14850	14862	14874	14886	14898	14910	14922	14934	14946	14958		
30	14803	14815	14827	14839	14851	14863	14875	14887	14899	14911	14923	14935	14947	14959		
36	14804	14816	14828	14840	14852	14864	14876	14888	14900	14912	14924	14936	14948	14960		
42	14805	14817	14829	14841	14853	14865	14877	14889	14901	14913	14925	14937	14949	14961		
48	14806	14818	14830	14842	14854	14866	14878	14890	14902	14914	14926	14938	14950	14962		
54	14807	14819	14831	14843	14855	14867	14879	14891	14903	14915	14927	14939	14951	14963		
60	14808	14820	14832	14844	14856	14868	14880	14892	14904	14916	14928	14940	14952	14964		
66	14809	14821	14833	14845	14857	14869	14881	14893	14905	14917	14929	14941	14953	14965		
72	14810	14822	14834	14846	14858	14870	14882	14894	14906	14918	14930	14942	14954	14966		
84	14811	14823	14835	14847	14859	14871	14883	14895	14907	14919	14931	14943	14955	14967		

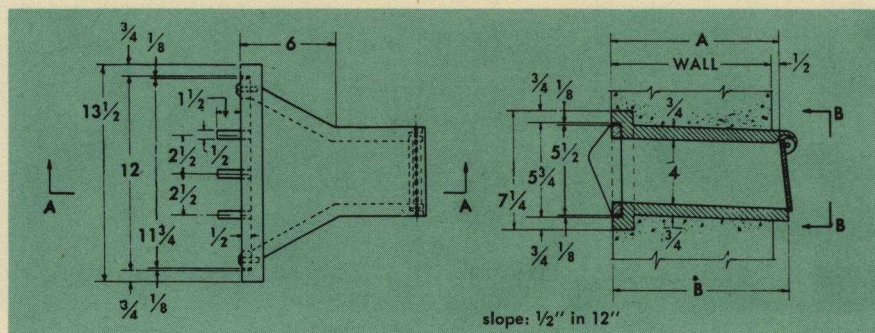
#### type 212 for soil pipe connection

12	34300	34308	34316	34324	20100											
18	34301	34309	34317	34325	20101											
24	34302	34310	34318	34326	20102											
30	34303	34311	34319	34327	20103											
36	34304	34312	34320	34328	20104											
42	34305	34313	34321	34329	20105											
48	34306	34314	34322	34330	20106											
54	34307	34315	34323	34331	20107											
60	34332	34334	34336	34338	20108											
72	34333	34335	34337	34339	20109											

#### type 213 for surface drainage

12	34400	34410	34420	34430	20110											
18	34401	34411	34421	34431	20111											
24	34402	34412	34422	34432	20112											
30	34403	34413	34423	34433	20113											
36	34404	34414	34424	34434	20114											
42	34405	34415	34425	34435	20115											
48	34406	34416	34426	34436	20116											
54	34407	34417	34427	34437	20117											
60	34408	34418	34428	34438	20118											
72	34409	34419	34429	34439	20119											

## wall scuppers



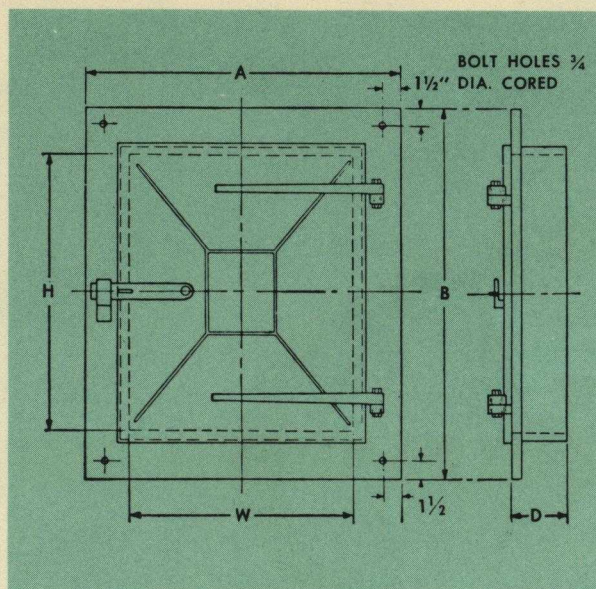
dimension B may be varied  
ordering: see page 2

wall size	all bronze		all aluminum		body- gray C.I. flap-cast brz grate- cast brz
	A	B			
type 658					
6	6½	7	16874	16870	22150
8	8½	9	16875	16871	22151
10	10½	11	16876	16872	22152
12	12½	13	16877	16873	22153



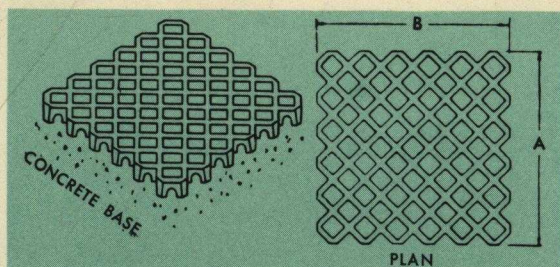
# RELATED PRODUCTS

## clean-out frame with door



**variations:** milled bearing surfaces on frame and door; pad-locked provision; baffle plates; arched top; provision for fire brick; gas tight service  
**ordering:** see page 2

## grid



				dimension D, in.				
W	H	A	B	4	6	8	10	12
Type 633								
4	6	10¾	12¾	63000	63001	63002	63003	63004
6	8	12¾	14¾	63005	63006	63007	63008	63009
8	10	14¾	16¾	63010	63011	63012	63013	63014
10	10	16¾	16¾	63015	63016	63017	63018	63019
	12	16¾	18¾	63020	63021	63022	63023	63024
12	8	18¾	14¾	63025	63026	63027	63028	63029
	10	18¾	16¾	63030	63031	63032	63033	63034
	12	18¾	18¾	63035	63036	63037	63038	63039
	16	18¾	22¾	63040	63041	63042	63043	63044
	18	18¾	24¾	63045	63046	63047	63048	63049
15	9	21¾	15¾	63050	63051	63052	63053	63054
16	16	22¾	22¾	63055	63056	63057	63058	63059
	10	22¾	16¾	63060	63061	63062	63063	63064
	20	22¾	26¾	63065	63066	63067	63068	63069
	24	22¾	30¾	63070	63071	63072	63073	63074
18	18	24¾	24¾	63075	63076	63077	63078	63079
	24	24¾	30¾	63080	63081	63082	63083	63084
	30	24¾	36¾	63085	63086	63087	63088	63089
20	16	26¾	22¾	63090	63091	63092	63093	63094
	20	26¾	26¾	63095	63096	63097	63098	63099
	30	26¾	36¾	63100	63101	63102	63103	63104
24	18	30¾	24¾	63105	63106	63107	63108	63109
	24	31	31	63110	63111	63112	63113	63114
	30	31	37	63115	63116	63117	63118	63119
	36	31	43	63120	63121	63122	63123	63124
	42	31	49	63125	63126	63127	63128	63129
	48	31	55	63130	63131	63132	63133	63134
30	24	37	31	63135	63136	63137	63138	63139
	30	37	37	63140	63141	63142	63143	63144
	36	37	43	63145	63146	63147	63148	63149
	48	37	55	63150	63151	63152	63153	63154
36	36	43	43	63155	63156	63157	63158	63159
	48	43	55	63160	63161	63162	63163	63164
	72	43	79	63165	63166	63167	63168	63169
42	48	49	55	63170	63171	63172	63173	63174

## type 493

cast iron for concrete floors

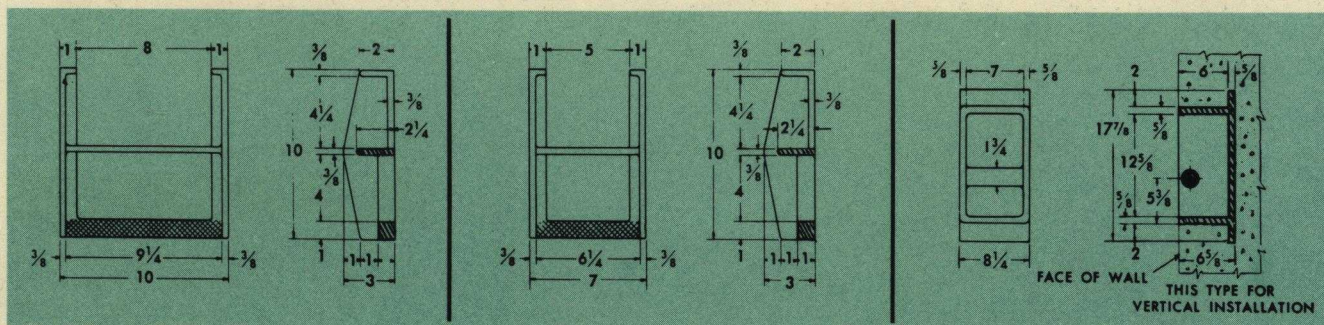
to provide a surface resistant to traction, impact, abrasion and corrosion  
**ordering:** see page 2

A	B	code no.
thickness, T: 3/4 in.		
12	12	38495-G
12	24	37428-G
thickness, T: 1 1/8 in.		
12	6	17526-G
12	12	17524-G
12	24	17525-G

## manhole steps

cast aluminum, steel and wrought iron types  
 available on request

**ordering:** by code number



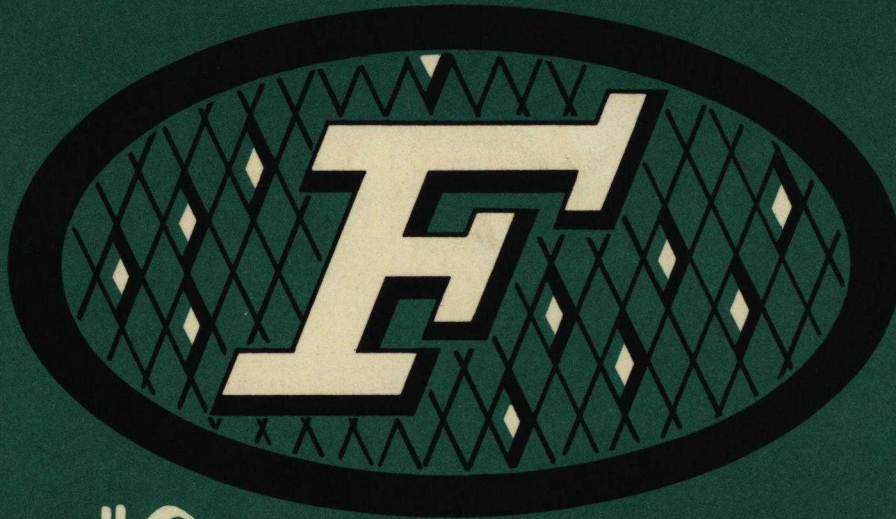
code 32206

code 30712

code 31666



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